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BOEING VERTOL CO PHILADELPHIA PA

F/G 1/3

CH-46 COMPOSITE ROTOR BLADE FLIGHT STRESS SURVEY DATA. VOLUME V--ETC(U)

1978 R AIELLO, J BENDO

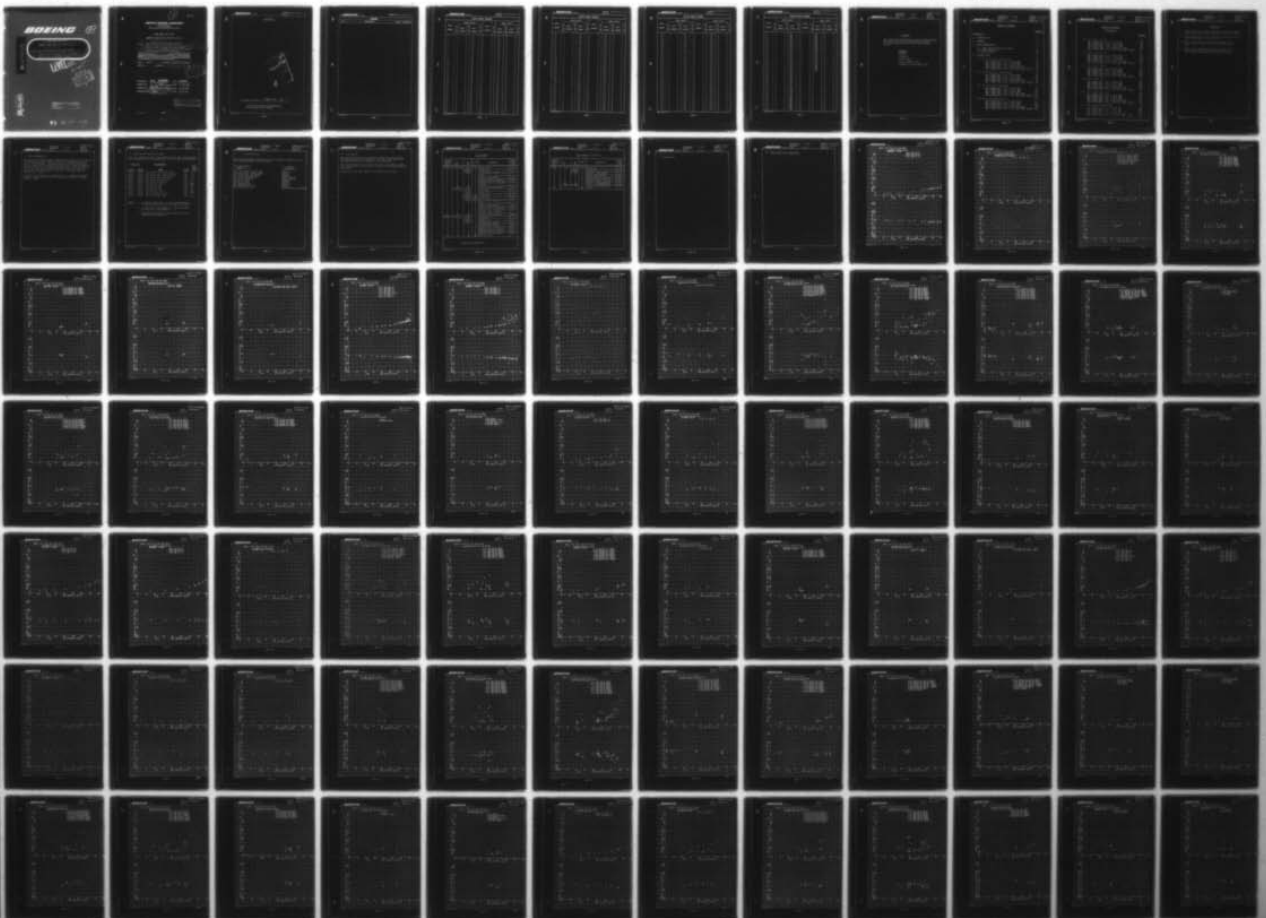
N00019-75-C-0396

UNCLASSIFIED

D210-11168-3-VOL-7

NL

1 of 4
AD-
A075616





NATIONAL BUREAU OF STANDARDS
MICROCOPY RESOLUTION TEST CHART

BOEING



AD A075616

(14)	CODE IDENT. NO. 77272
(6)	NUMBER D210-11168-3-Volume 7 of 13 VOL-7
TITLE	CH-46 COMPOSITE ROTOR BLADE FLIGHT
	STRESS SURVEY DATA, PLOTTED AFT ROTOR
	ROTATING AND STATIONARY CONTROLS

LEVEL III

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A DIVISION OF THE BOEING COMPANY

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14 CODE IDENT. NO. 77272

6 NUMBER D210-11168-3-Volume 7 of 13

VOL-7

TITLE CH-46 COMPOSITE ROTOR BLADE FLIGHT

STRESS SURVEY DATA, PLOTTED AFT ROTOR

ROTATING AND STATIONARY CONTROLS

Volume VII.

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MODEL CH-46 CONTRACT N00019-75-C-0396

ISSUE NO. _____ ISSUED TO: 15

10 R./Aiello
J./Bendo

11 1978

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PREPARED BY

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DATE 11/22/78

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REVISIONS			
LTR	DESCRIPTION	DATE	APPROVAL

ACTIVE SHEET RECORD											
SHEET NUMBER	REV LTR	ADDED SHEETS				SHEET NUMBER	REV LTR	ADDED SHEETS			
		SHEET NUMBER	REV LTR	SHEET NUMBER	REV LTR			SHEET NUMBER	REV LTR	SHEET NUMBER	REV LTR
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2				32				62			
3				33				63			
4				34				64			
5				35				65			
6				36				66			
7				37				67			
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11				41				71			
12				42				72			
13				43				73			
14				44				74			
15				45				75			
16				46				76			
17				47				77			
18				48				78			
19				49				79			
20				50				80			
21				51				81			
22				52				82			
23				53				83			
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25				55				85			
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30				60				90			

FORM 40200 (7/67)

ACTIVE SHEET RECORD											
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98				128				158			
99				129				159			
100				130				160			
101				131				161			
102				132				162			
103				133				163			
104				134				164			
105				135				165			
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108				138				168			
109				139				169			
110				140				170			
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112				142				172			
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114				144				174			
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118				148				178			
119				149				179			
120				150				180			

FORM 40200 (7/57)

ACTIVE SHEET RECORD											
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183				213				243			
184				214				244			
185				215				245			
186				216				246			
187				217				247			
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203				233				263			
204				234				264			
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210				240				270			

FORM 40200 (7/67)

ACTIVE SHEET RECORD											
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293				344							
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FORM 48288 (7/67)

PREPARED BY: J. Bendo
CHECKED BY:
DATE: 8/28/78

D210-11168-3
NUMBER Vol. 7
REV LTR
MODEL NO.

ABSTRACT

This report volume presents plotted aft rotor rotating and stationary control loads measured during the CH-46 Composite Rotor Blade Flight Stress Survey.

KEYWORDS

CH-46E

Composite

Rotor Blade

Flight Stress Survey

Alternating and Steady Loads

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GW = 20800 lbs., C.G. = 9.7" Aft	66
GW = 24300 lbs., C.G. = 13.2" Fwd	82
GW = 24300 lbs., C.G. = Aft (4.4" Fwd)	89
GW = 24300 lbs., C.G. = 1.5" Aft (Ext. Cargo)	96
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GW = 20800 lbs., C.G. = 22.4" Fwd	98
GW = 20800 lbs., C.G. = 9.7" Aft	106
GW = 24300 lbs., C.G. = 13.2" Fwd	115
GW = 24300 lbs., C.G. = Aft (4.4" Fwd)	122
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GW = 20800 lbs., C.G. = 9.7" Aft	140
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GW = 24300 lbs., C.G. = Aft (4.4" Fwd)	224
GW = 24300 lbs., C.G. = 1.5" Aft (Ext. Cargo)	231
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GW = 20800 lbs., C.G. = 22.4" Fwd	233
GW = 20800 lbs., C.G. = 9.7" Aft	242
GW = 24300 lbs., C.G. = 13.2" Fwd	251
GW = 24300 lbs., C.G. = Aft (4.4" Fwd)	258
GW = 24300 lbs., C.G. = 1.5" Aft (Ext. Cargo)	265
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GW = 20800 lbs., C.G. = 22.4" Fwd	267
GW = 20800 lbs., C.G. = 9.7" Aft	276
GW = 24300 lbs., C.G. = 13.2" Fwd	285
GW = 24300 lbs., C.G. = Aft (4.4" Fwd)	292
GW = 24300 lbs., C.G. = 1.5" Aft (Ext. Cargo)	299
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GW = 20800 lbs., C.G. = 22.4" Fwd	301
GW = 20800 lbs., C.G. = 9.7" Aft	310
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GW = 24300 lbs., C.G. = Aft (4.4" Fwd)	360
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REFERENCES

1. Vertol Report D210-11168-1 "CH-46 Composite Rotor Blade Flight Test Qualification Test Plan" March 30, 1977
2. Vertol Report D210-11168-2 "CH-46 Composite Rotor Blade Flight Test Report" May 15, 1978
3. Boeing Vertol Report D210-11168-3 Volume 1 of 13, CH-46 Composite Rotor Blade Flight Stress Survey Data
4. Boeing Vertol Report D210-11168-3 Volume 11 of 13, CH-46 Composite Rotor Blade Flight Stress Survey Data, Tabulated Forward and Aft Control Loads

1. INTRODUCTION

A flight stress survey was conducted on a CH-46 helicopter with A02R1702 composite rotor blades. The test was conducted in accordance with Paragraphs 4.3.2 and 4.7 of Reference 1. General test description and pilot comments are included in Reference 2.

The tests were conducted at the Boeing Vertol Flight Test Facility at Ridley Township, Pennsylvania, during the period of June 1977 through November 1977.

2. SUMMARY

A flight stress survey and structural demonstration was conducted on the #1 CH-46E Helicopter, BuNo. 153372 (S/N 2268).

The components under test were the A02R1702 composite rotor blades and the A02R1710 blade socket.

This volume contains measured steady and alternating aft rotor rotating and stationary controls loads plotted versus true airspeed. The same data is tabulated in Volume 11.

3. DATA PRESENTATION

This report contains measured steady and alternating aft rotating and stationary control loads. The data is presented as plots versus true airspeed. The steady and alternating values are plotted separately and appear together as two plots per page for various level flight and maneuver conditions. The load levels shown represent the maximum alternating load cycle occurring during the particular flight condition. This same data is tabulated in Volume 11.

Detailed flight condition parameters and a complete tabulated summary of maneuvers for each flight can be found in Volume 1 of this report.

3.1 Gage Identification and Index

Data plot indexing, strain gage identification and instrumentation code information for data presented in this volume are as follows:

<u>DATA CODE</u>		<u>MEASUREMENT</u>		<u>DATA PLOT PAGE #</u>
<u>ACTIVE</u>	<u>SPARE</u>	<u>NAME</u>	<u>UNITS</u>	
49250	69250	Aft Pitch Link, Green Blade	(LB)	21
49660	69660	Aft Pitch Link, Yellow Blade	(LB)	55
49580	69580	Aft Pitch Link, Red Blade	(LB)	97
49460	49440	Aft Drive Scissors Arm	(LB)	130
49670	65100	Aft Static Scissors	(LB)	164
45010	65010	Aft LH C/P Link	(LB)	198
45020	65020	Aft RH C/P Link	(LB)	232
45030	65030	Aft Lateral Link	(LB)	266
45040	65040	Aft Longitudinal Link	(LB)	300
45050	65050	Aft Coll/Pitch Yoke	(LB)	334

- NOTES:
1. A complete description of the instrumentation for this stress survey can be found in Volume 1.
 2. A flight by flight summary of operative gages can be found in Reference 2.
 3. The spare gages were utilized when the active gages proved inoperable.

3.2 Sign Convention

The following table summarizes the sign convention adhered to for the gages presented in this volume.

<u>GAGE MEASUREMENT NAME</u>	<u>(+) POLARITY CONDITION</u>
Aft Pitch Link, Green Blade	Tension
Aft Pitch Link, Yellow Blade	Tension
Aft Pitch Link, Red Blade	Tension
Aft Drive Scissors Arm	Blade Lagging
Aft Static Scissors	Swashplate CW
Aft LH c/p Link	Tension
Aft RH c/p Link	Tension
Aft Lateral Link	Tension
Aft Longitudinal Link	Tension
Aft Coll/Pitch Yoke	Boost Actuator Extended

3.3 Plot Format

The data plots have been grouped by common flight conditions and maneuvers and are presented in the order outlined by the data plot format table included on the next page.

For identification of data plots the plot code number in the right hand column of the table is printed on each corresponding plot chart.

Please note that many symbols are used more than once.

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 CHECKED BY:
 DATE: 9/5/78

D210-11168-3
 NUMBER Vol. 7
 REV LTR
 MODEL NO.

PLOT FORMAT

GROSS WEIGHT LBS.	C.G. IN.	HD FT.	RPM	CONDITION	PLOT CODE NO.
20800 ↓	22.4"Fwd ↓	2000	264 ↓	Level Flt.	- 1
		14000		Level Flt.	- 2
		All		Pullups(PWR ON&OFF), P.P.D. Rec.	-11
		↓		Turns (PWR ON&OFF)	-15
		↓		Control Rev.'s (PWR ON)	-19
		↓		Control Rev.'s (PWR OFF), Flares	-23
	9.7"Aft ↓	2000	248 ↓	P.P.D.'s, Autorotation	-27
		6000		Level Flt.	- 3
		14000		Level Flt.	- 4
		6000		Level Flt.	- 5
		All		Level Flt.	-10
		↓		Pullups(PWR ON&OFF), P.P.D. Rec.	-12
24300 ↓	13.2"Fwd ↓	2000	264 ↓	Turns (PWR ON&OFF)	-16
		8000		Control Rev.'s (PWR ON)	-20
		All		Control Rev.'s(PWR OFF), Spiral Desc., Flares	-24
		↓		P.P.D.'s Autorotation	-28
		↓		Level Flt.	- 6
		↓		Level Flt.	- 7
		↓		Pullups(PWR ON&OFF)	-13
		↓		Turns (PWR ON&OFF)	-17
				Control Rev.'s (PWR ON)	-21
				Spiral Descent, Flares	-25
				P.P.D.'s, P.P.D. Rec., Autorotation	-29

CONTINUED ON NEXT PAGE

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 DATE: 9/5/78

D210-11162-3
 NUMBER Vol. 7
 REV LTR
 MODEL NO.

Plot Format (Continued)

GROSS WEIGHT LBS.	C.G. IN.	HD FT.	RPM	CONDITION	PLOT CODE NO.	
24300 ↓	4.4"Fwd ↓	2000	264 ↓	Level Flt.	- 8	
		8000		Level Flt.	- 9	
		All ↓		Pullups (PWR ON&OFF)	-14	
	1.5"Aft	2000		Turns (PWR ON&OFF)	-18	
				Control Rev.'s (PWR ON)	-22	
				Spiral Descent, Flares	-26	
				P.P.D.'s, Autorotation	-30	
				Level Flight (External Cargo)	-35	

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DATE: 9/5/78

D210-11168-3
NUMBER Vol. 7
REV LTR
MODEL NO.

4. PLOTTED DATA

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PREPARED BY: J. Bendo

CHECKED BY:

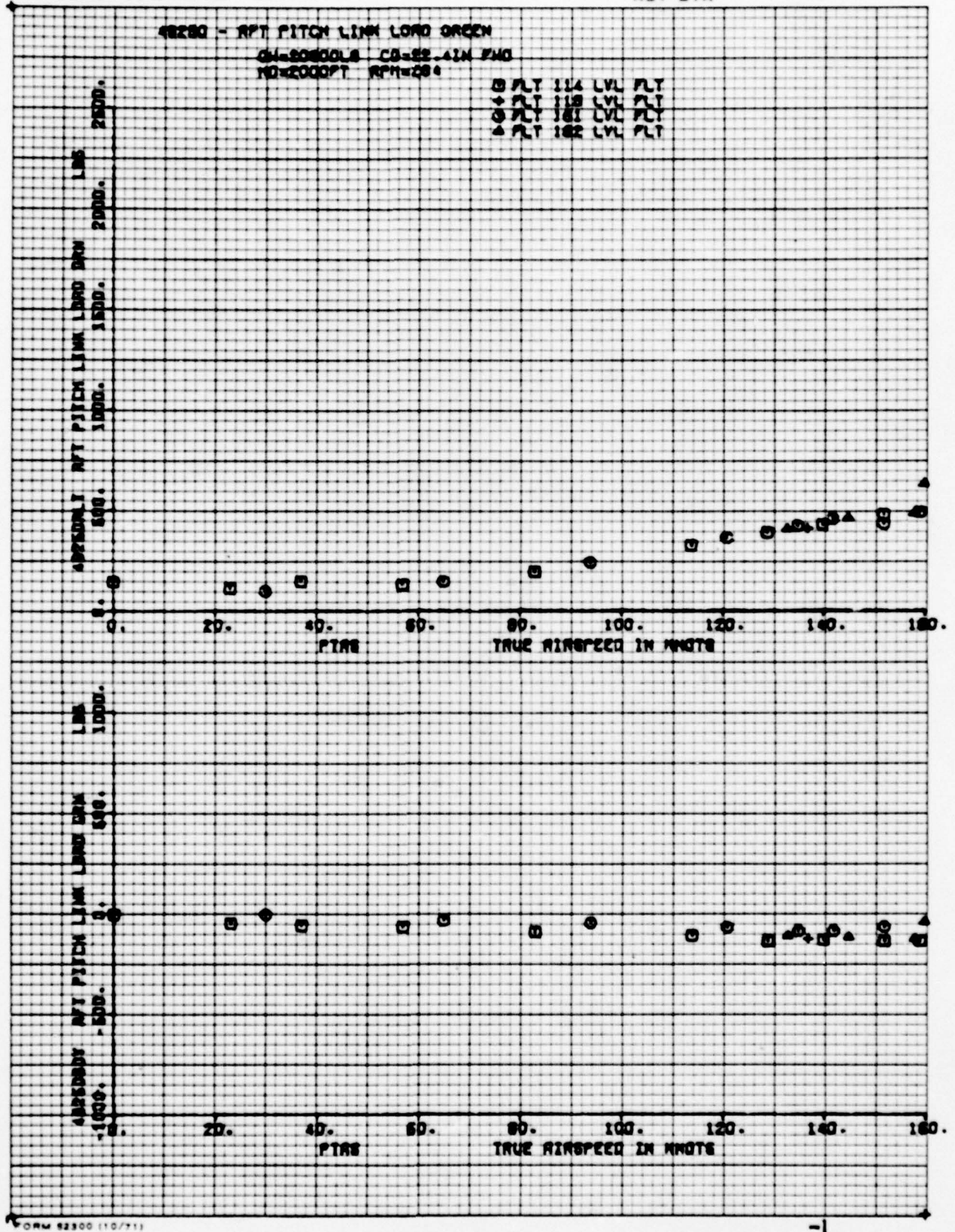
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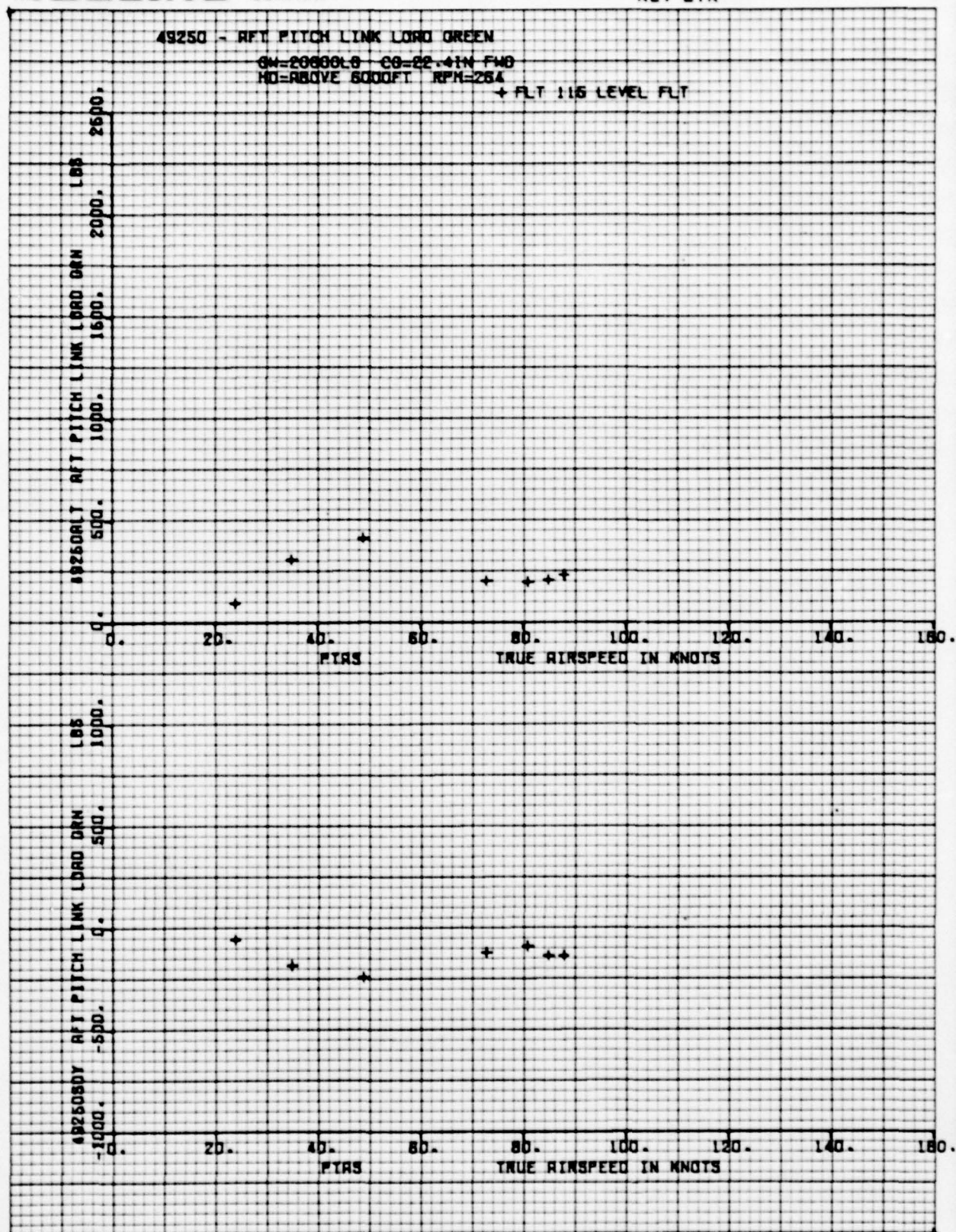
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REV LTR Volume 7

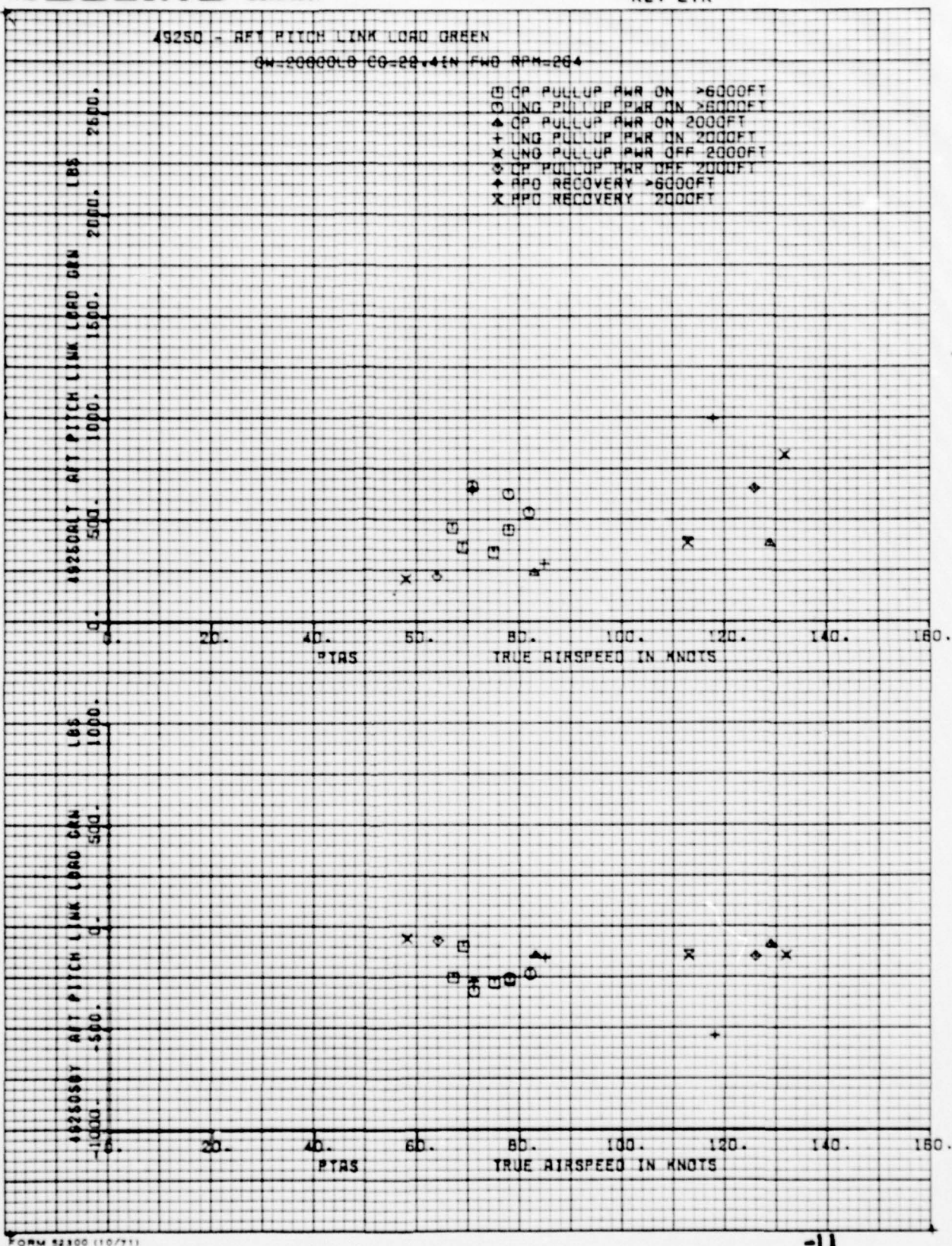
MODEL NO.

4.1 Aft Pitch Link, Green Blade

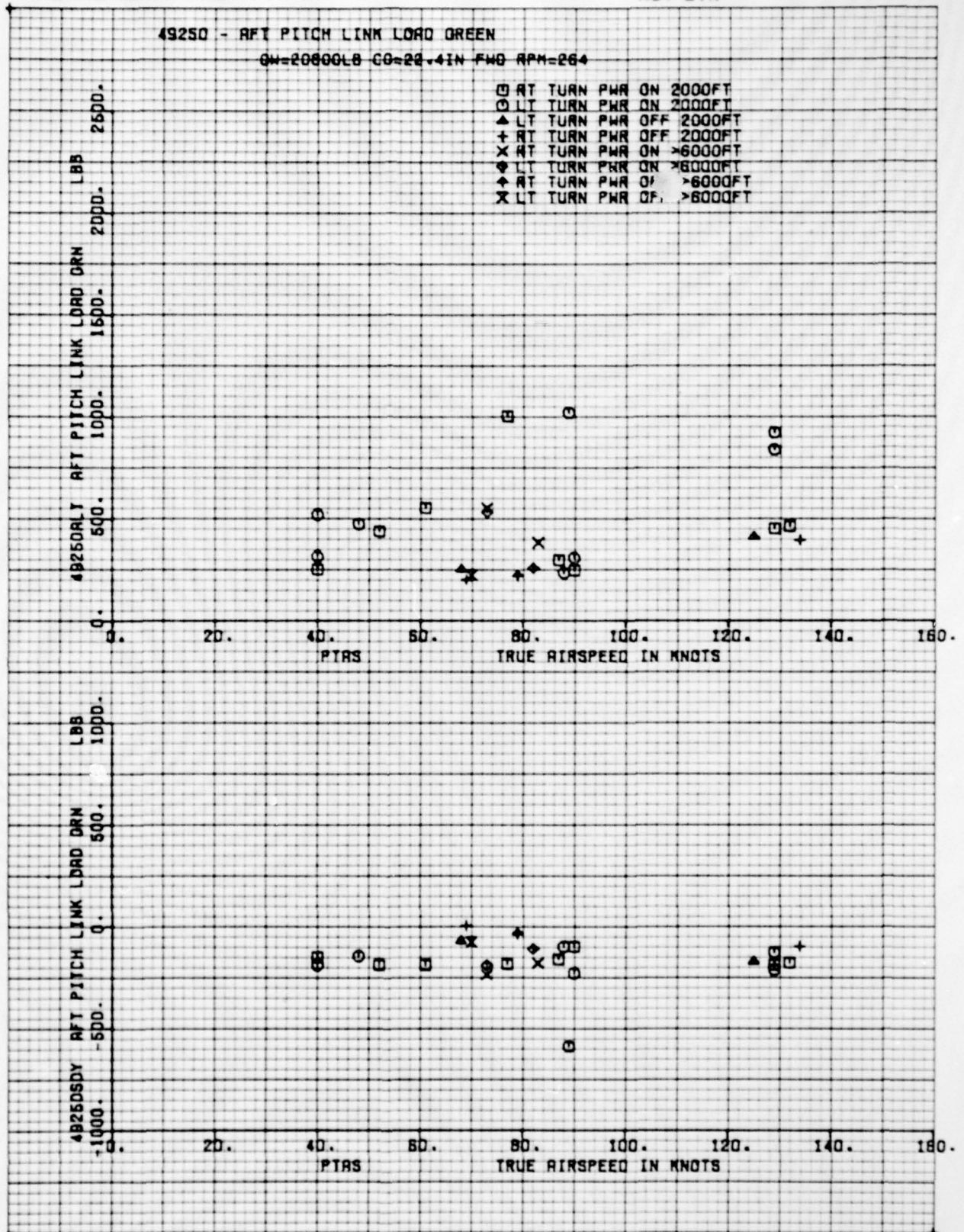
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FORM 82300 (10/71)



FORM 52300 (10/71)

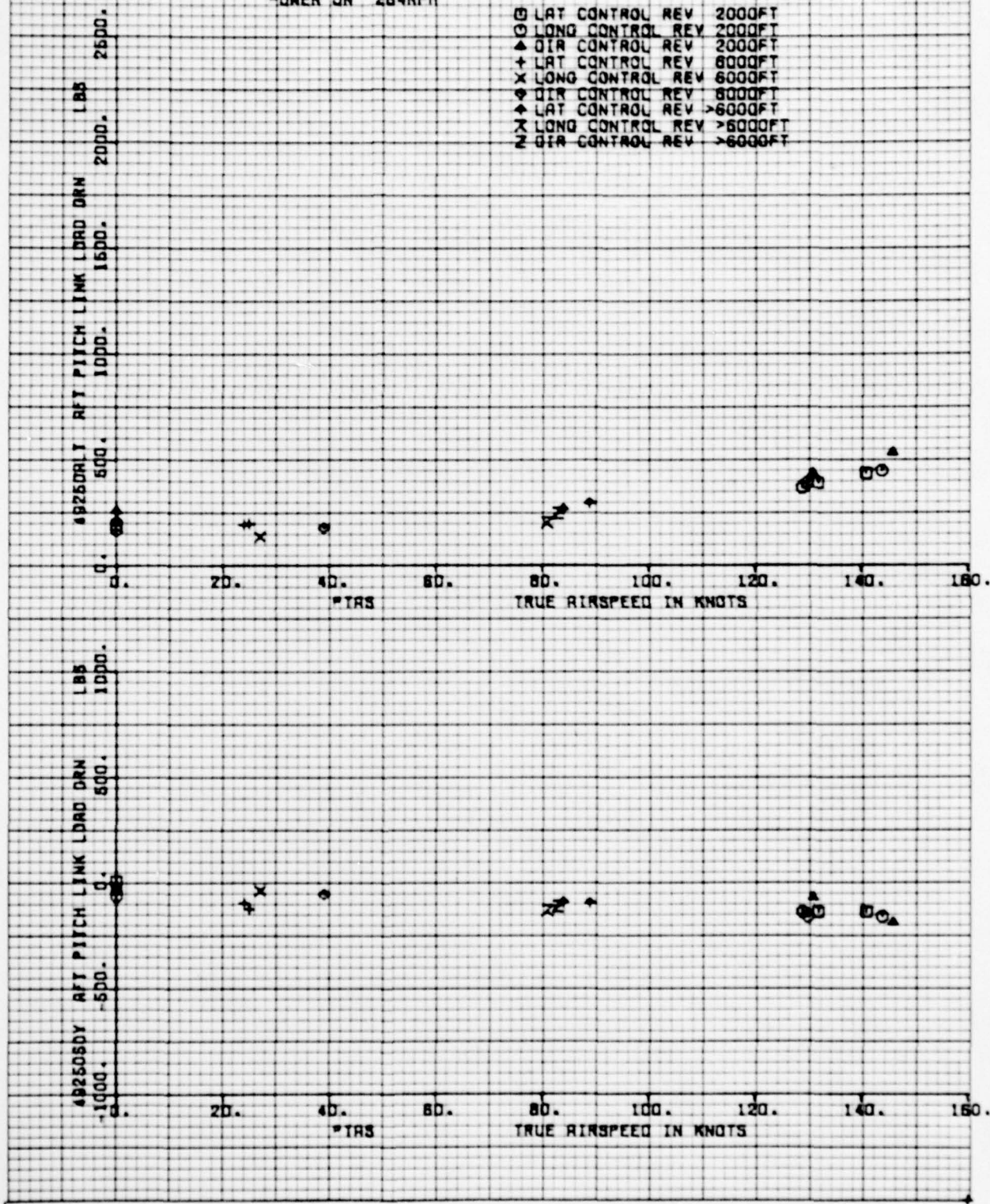


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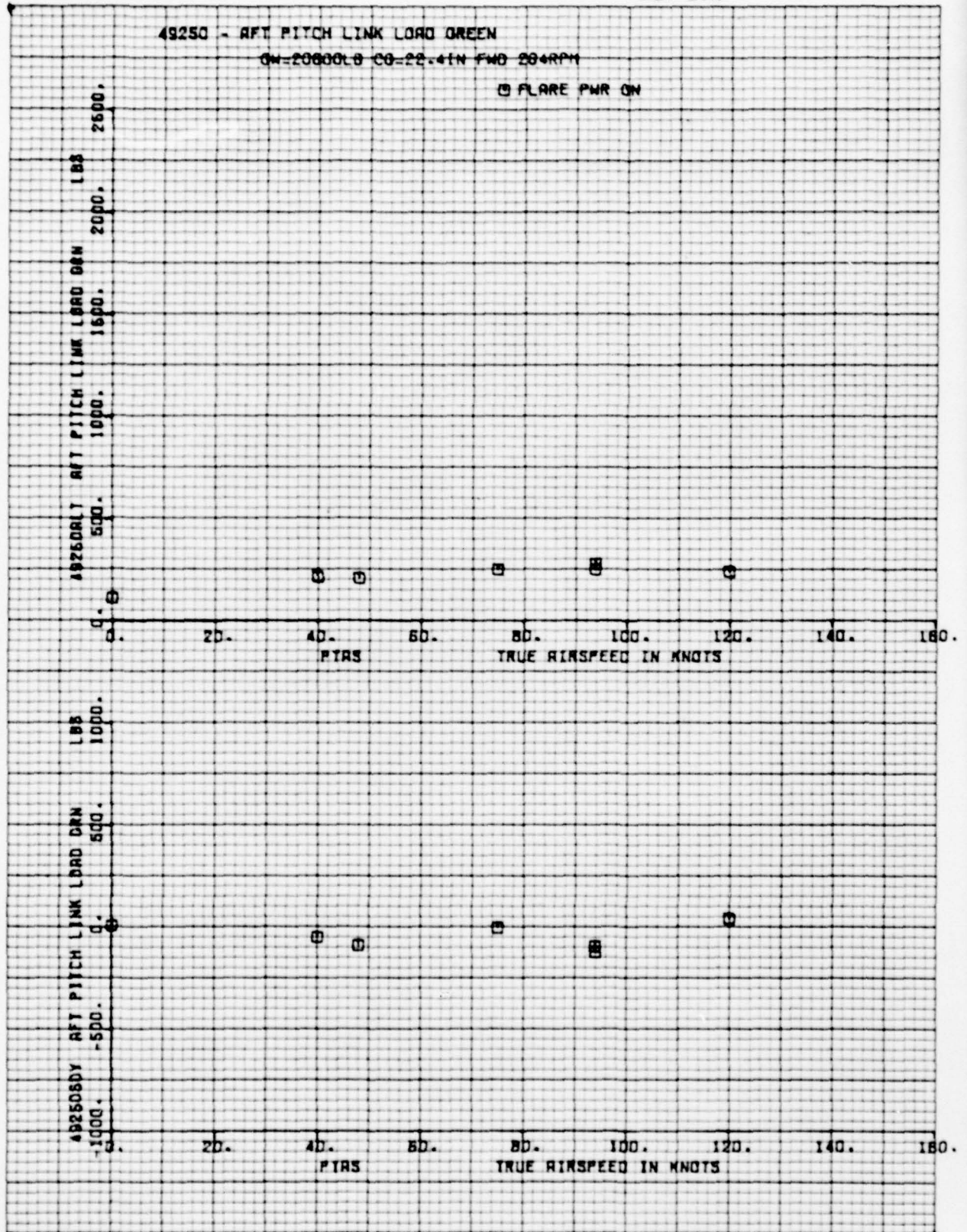
49250 - RFT PITCH LINK LOAD GREEN

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POWER ON 264RPM

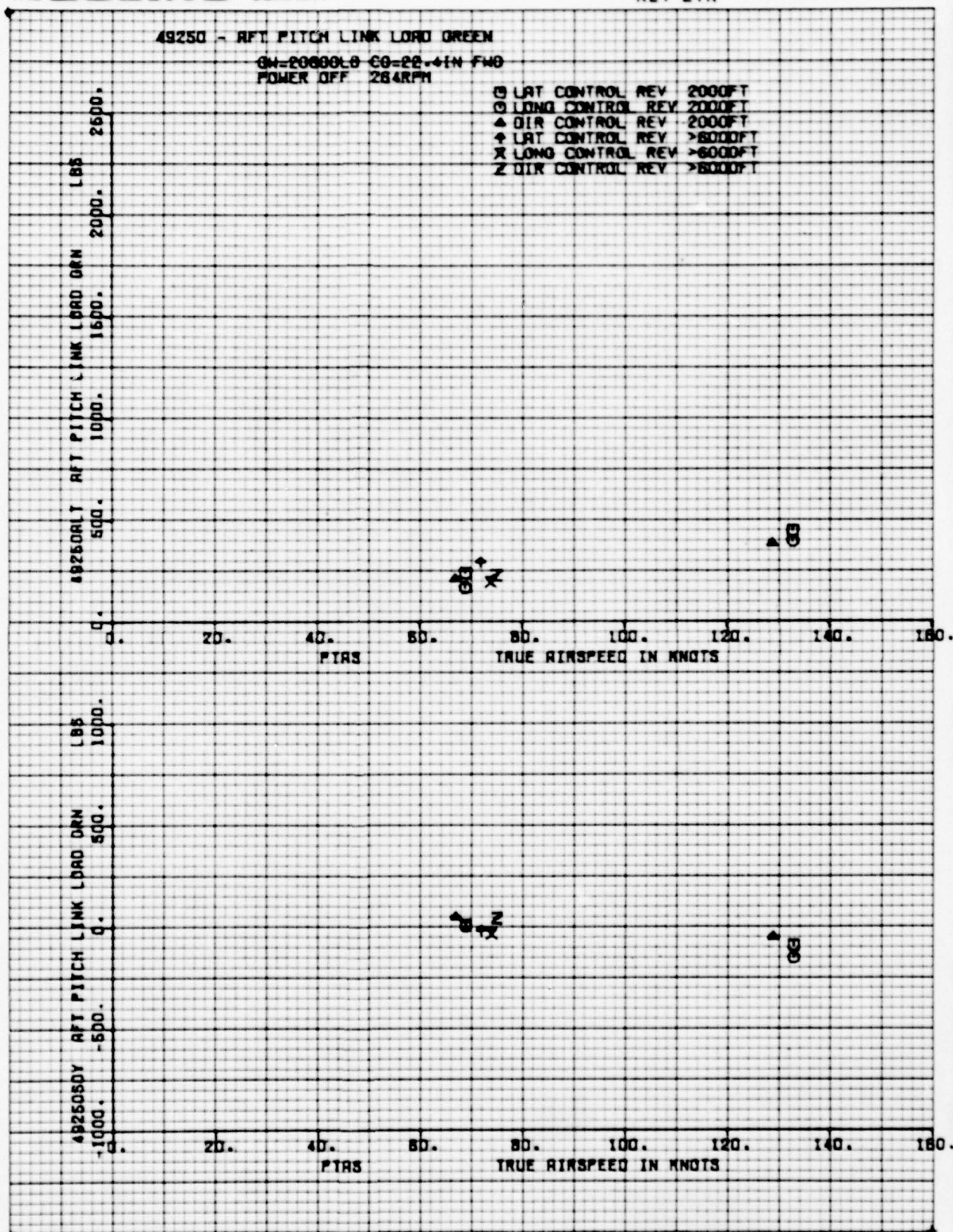
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 O LONG CONTROL REV 2000FT
 ▲ DIR CONTROL REV 2000FT
 + LAT CONTROL REV 6000FT
 X LONG CONTROL REV 6000FT
 ◆ DIR CONTROL REV 8000FT
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 X LONG CONTROL REV >6000FT
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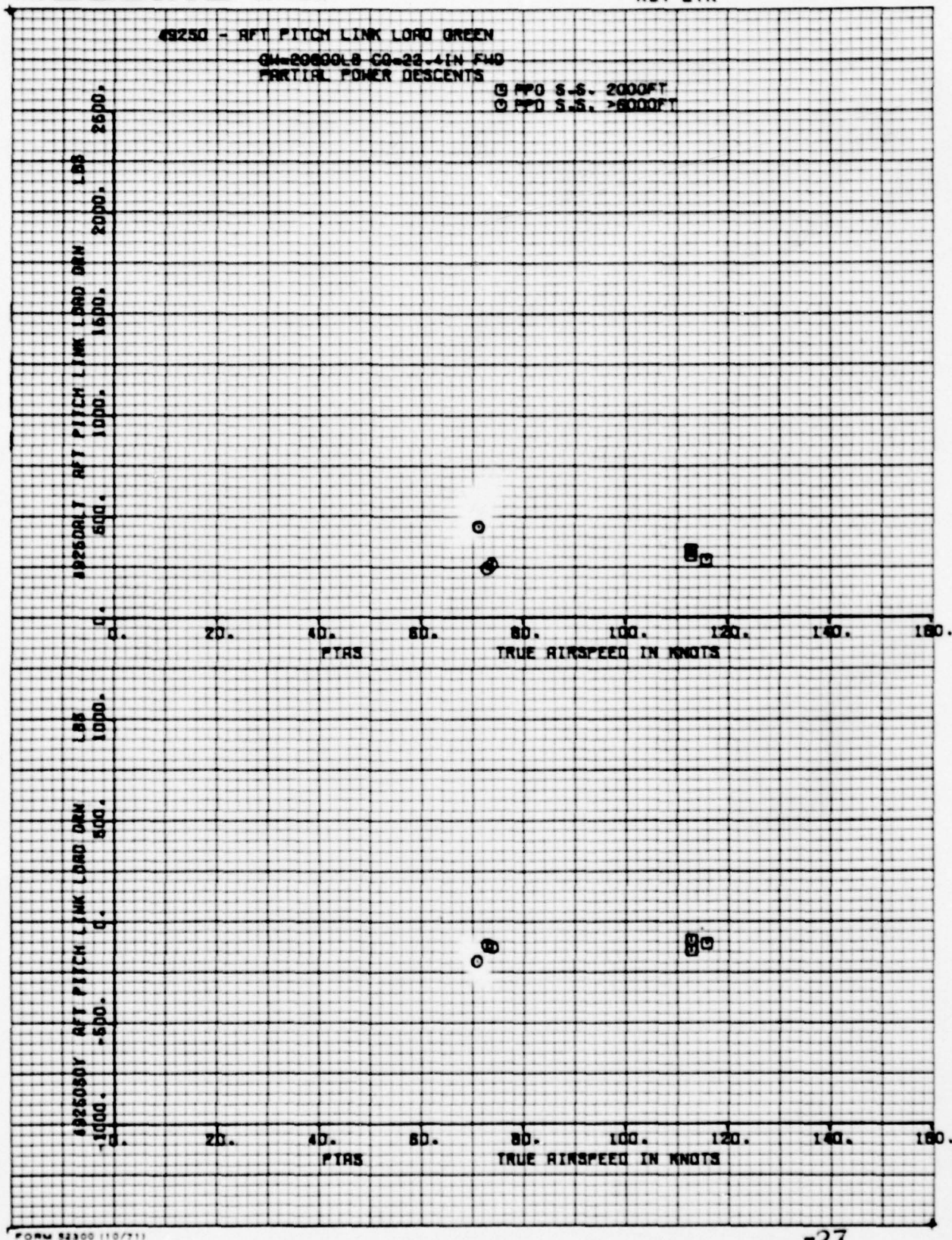


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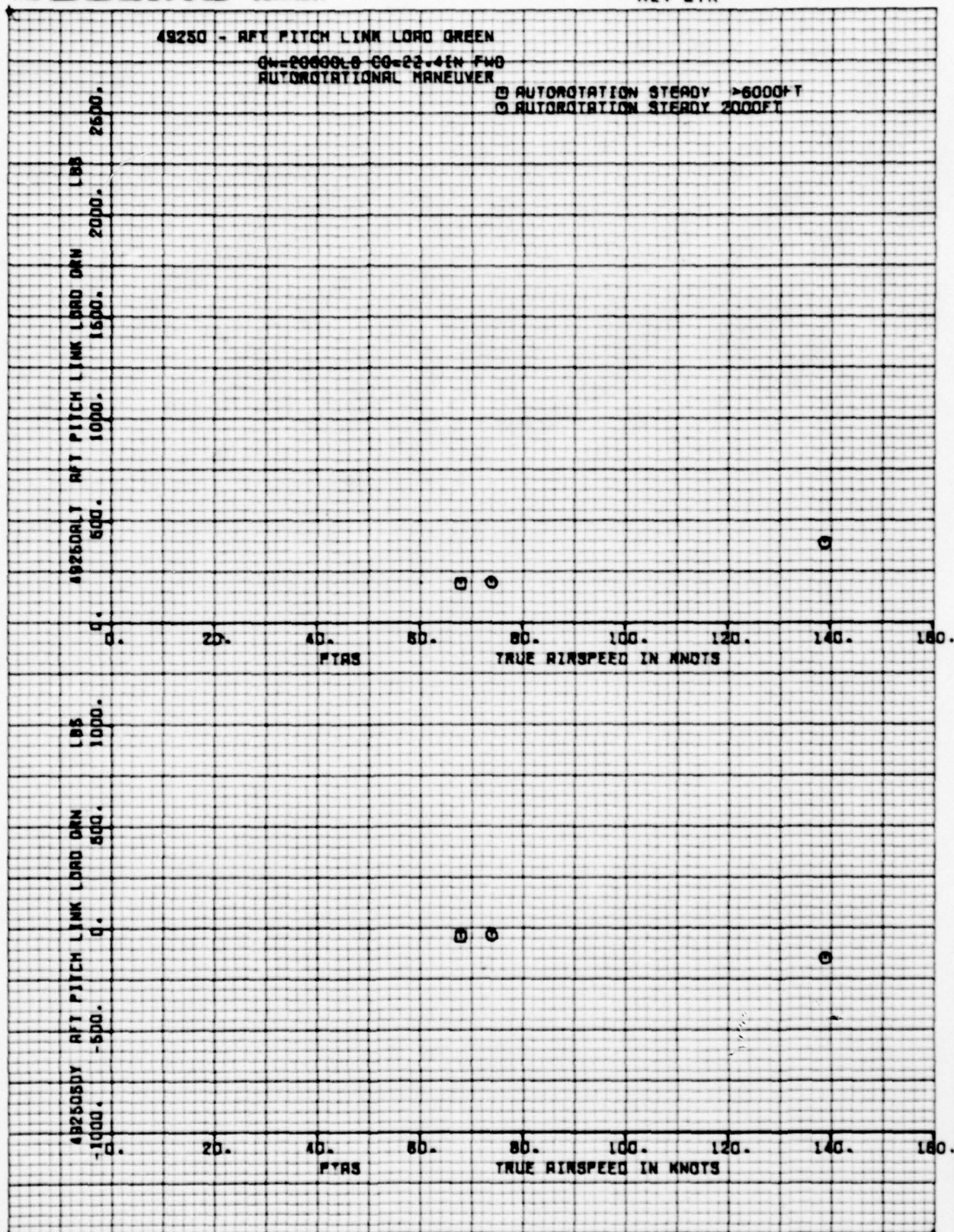


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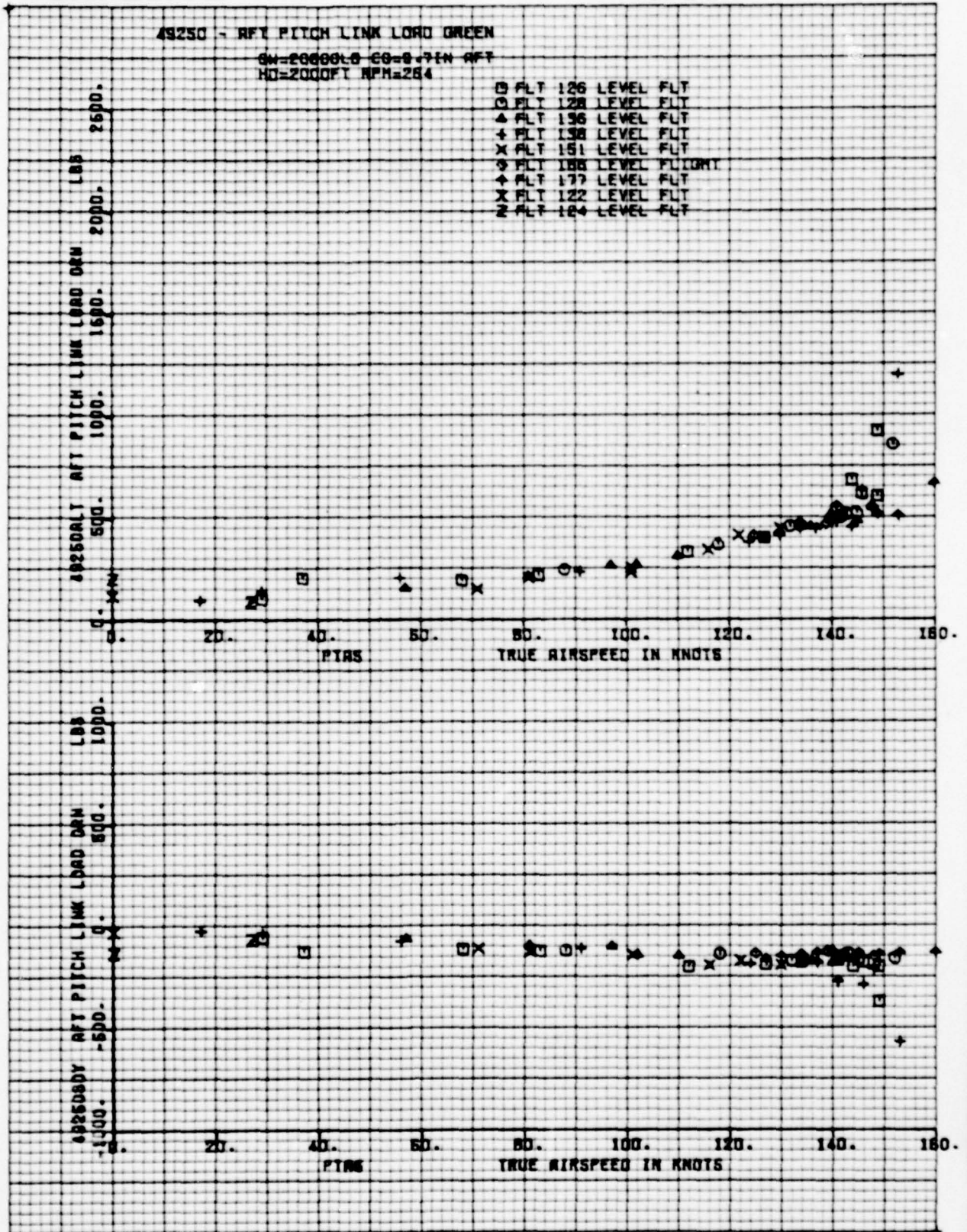


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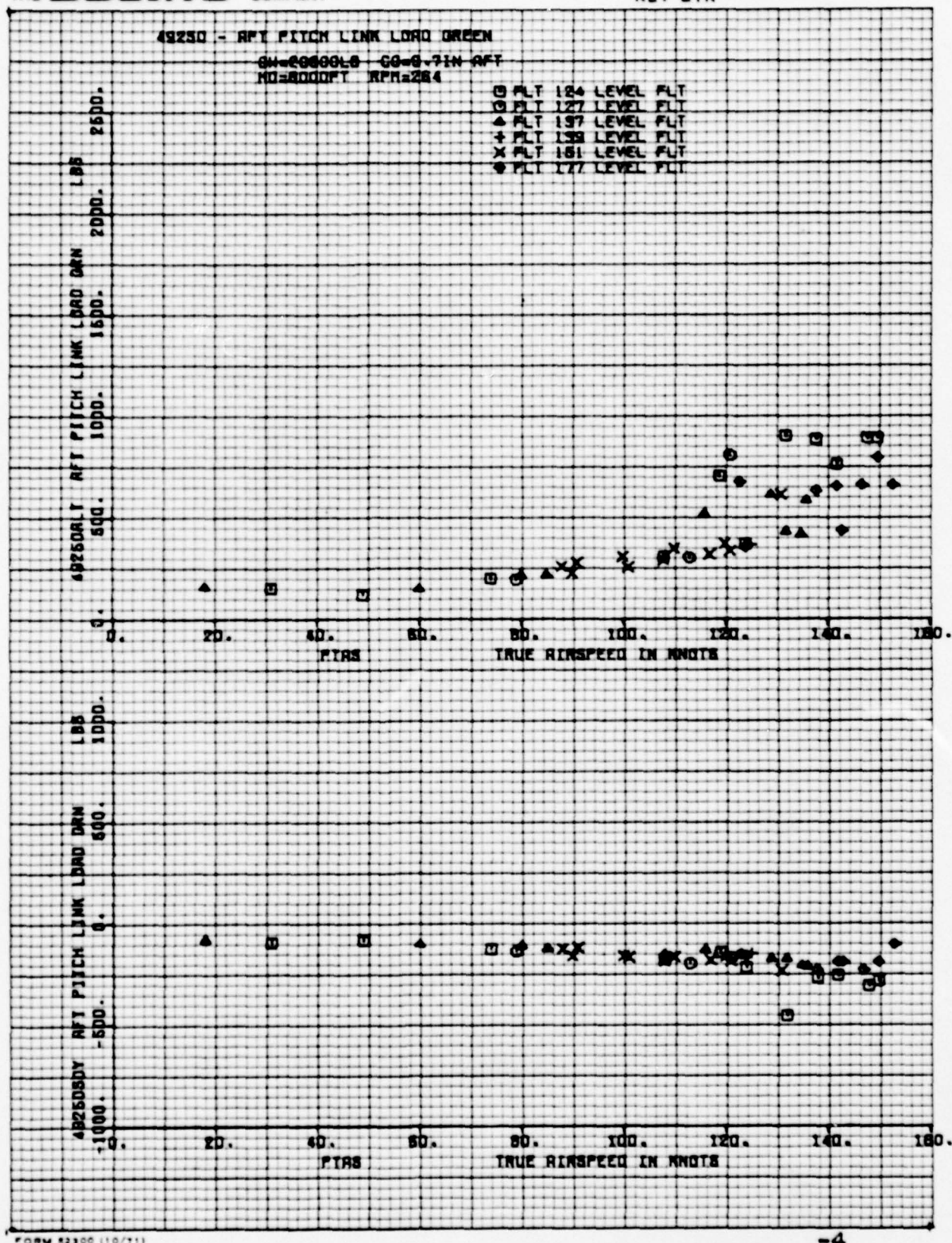
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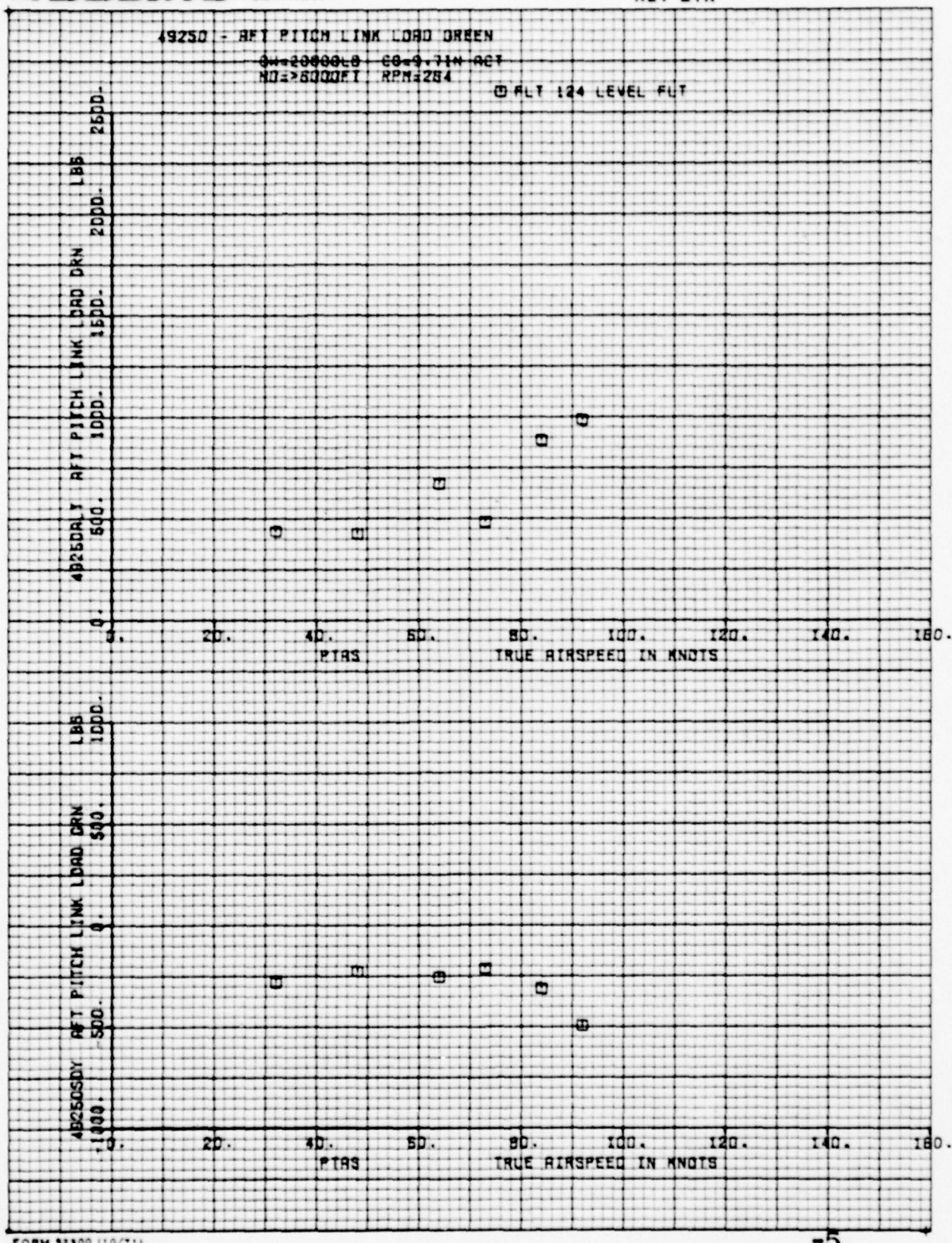
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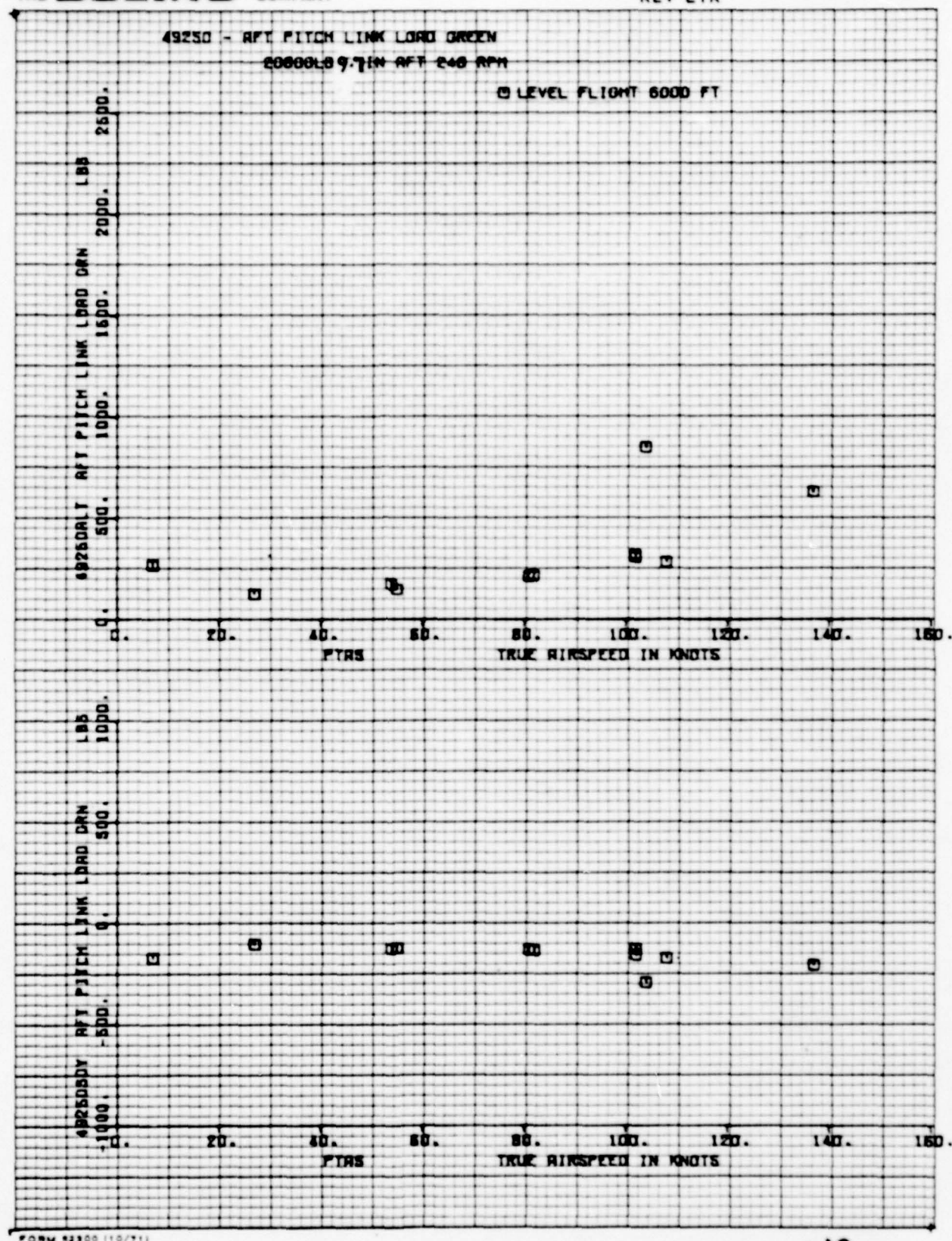
FORM 52300 (11/71)

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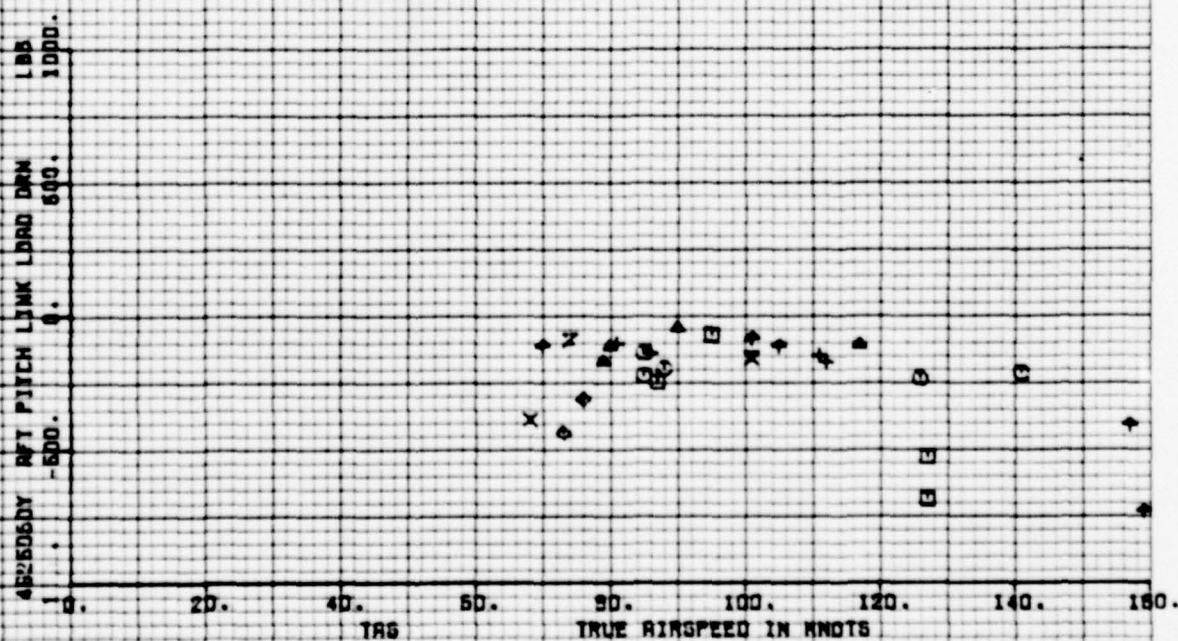
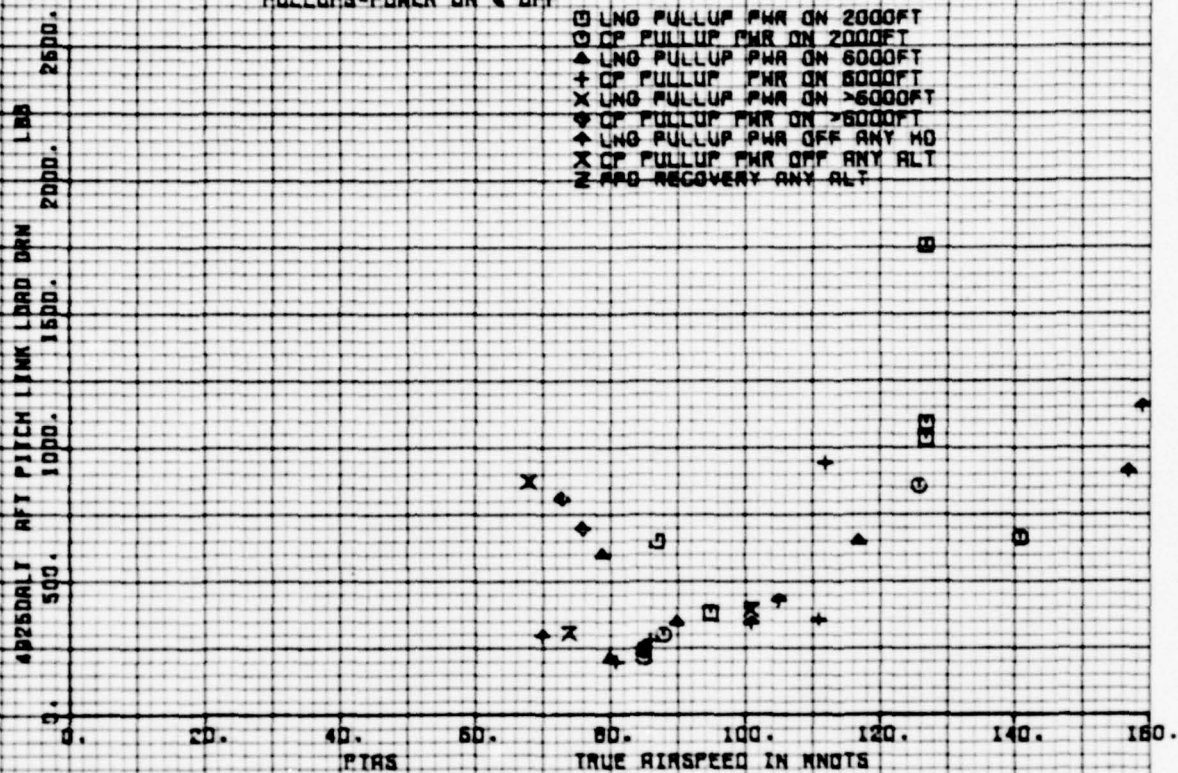
FORM 52300 (10/71)

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49250 - AFT PITCH LINK LOAD GREEN

GN-20000L8 CG-9.7IN AFT 26480M
PULLUPS-POWER ON & OFF

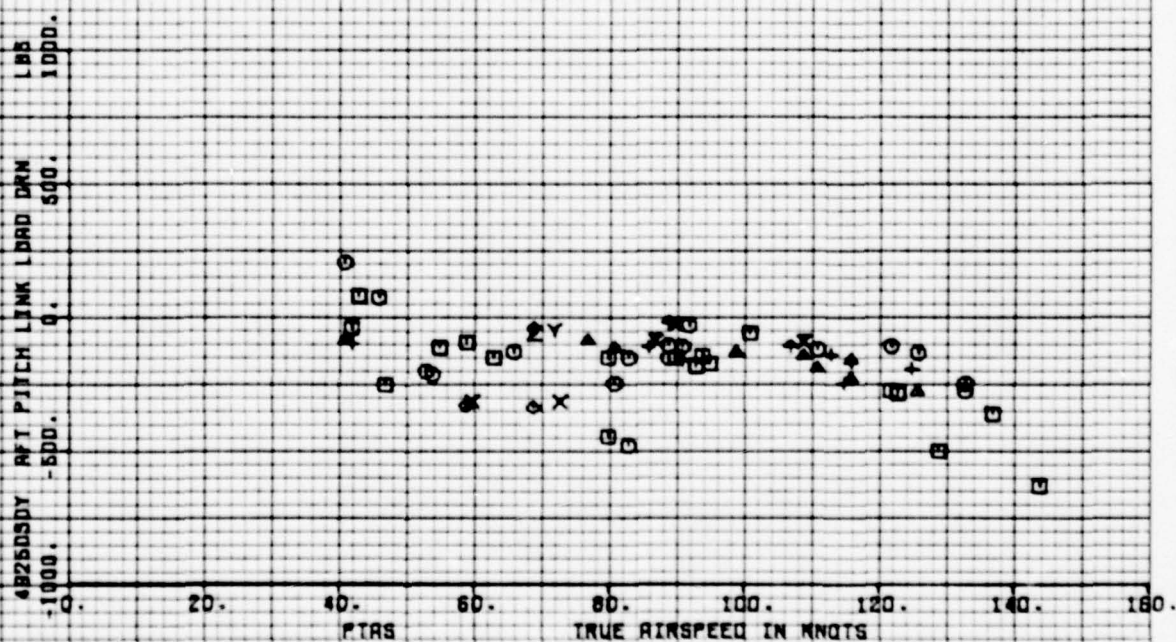
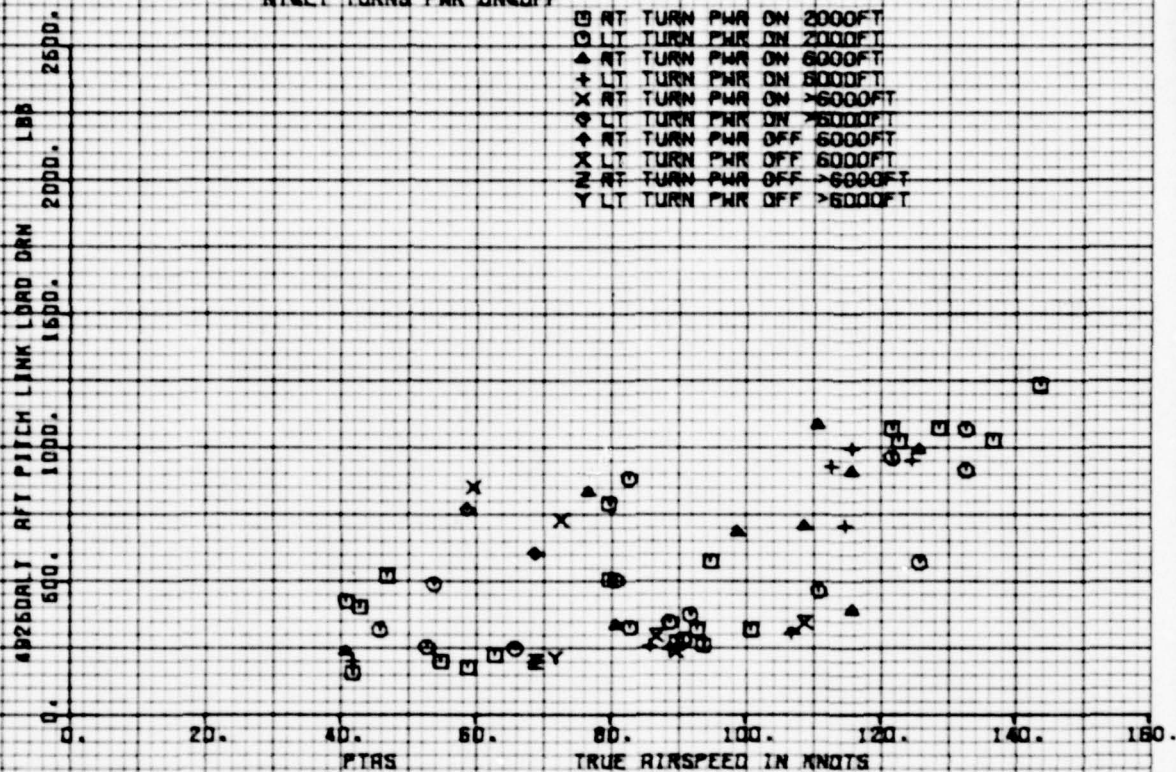
- LNO PULLUP PWR ON 2000FT
- ◐ CP PULLUP PWR ON 2000FT
- ▲ LNO PULLUP PWR ON 6000FT
- † CP PULLUP PWR ON 6000FT
- × LNO PULLUP PWR ON >6000FT
- ◑ CP PULLUP PWR ON >6000FT
- ◆ LNO PULLUP PWR OFF ANY MO
- × CP PULLUP PWR OFF ANY ALT
- 2 AND RECOVERY ANY ALT

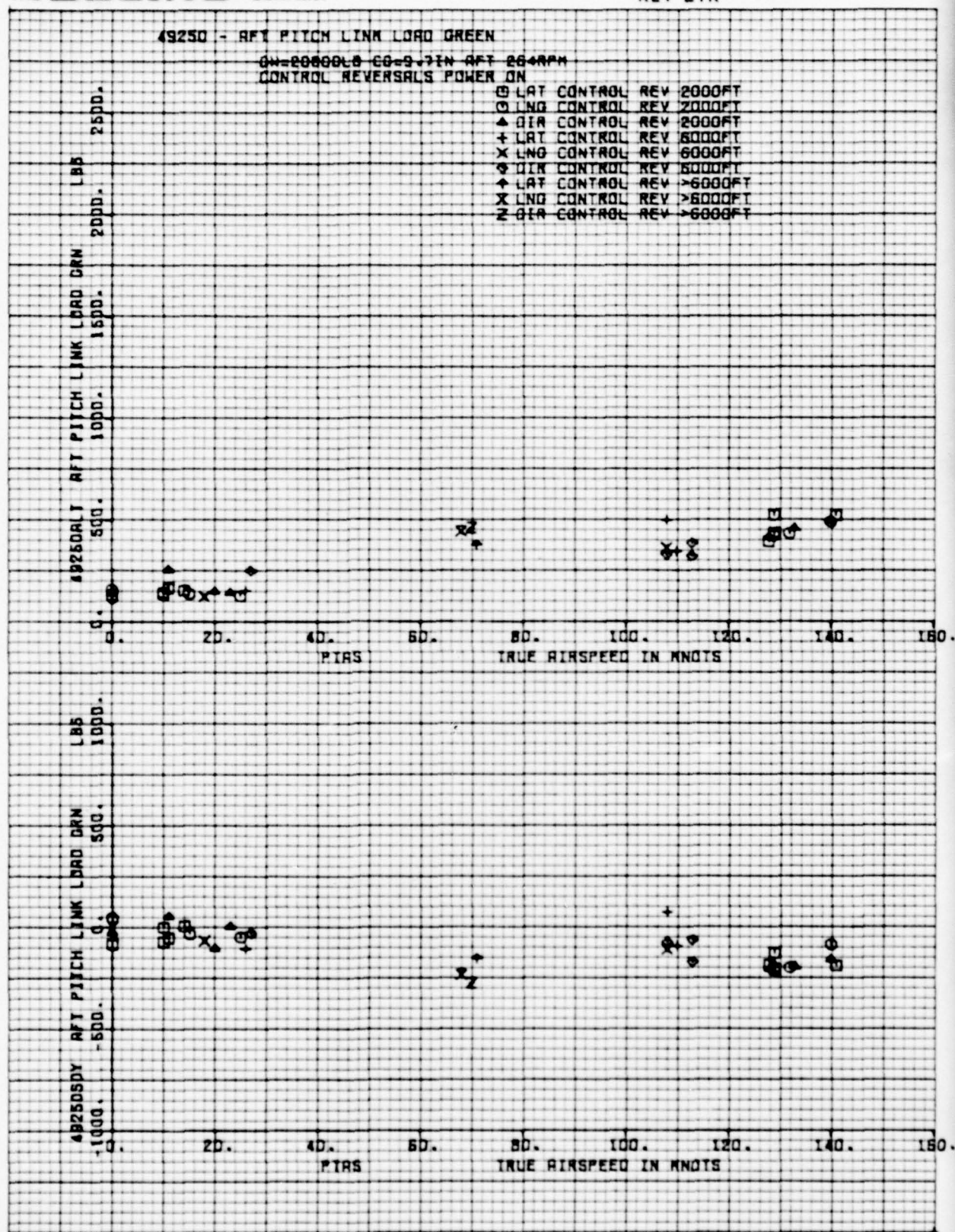


49250 - RFT PITCH LINK LOAD GREEN

GW=20000LB CG=9.71N RFT 264RPM
RT< TURNS PWR ON&OFF

B RT TURN PWR ON 2000FT
 O LT TURN PWR ON 2000FT
 A RT TURN PWR ON 6000FT
 + LT TURN PWR ON 6000FT
 X RT TURN PWR ON >6000FT
 O LT TURN PWR ON >6000FT
 + RT TURN PWR OFF 6000FT
 X LT TURN PWR OFF 6000FT
 Z RT TURN PWR OFF >6000FT
 Y LT TURN PWR OFF >6000FT

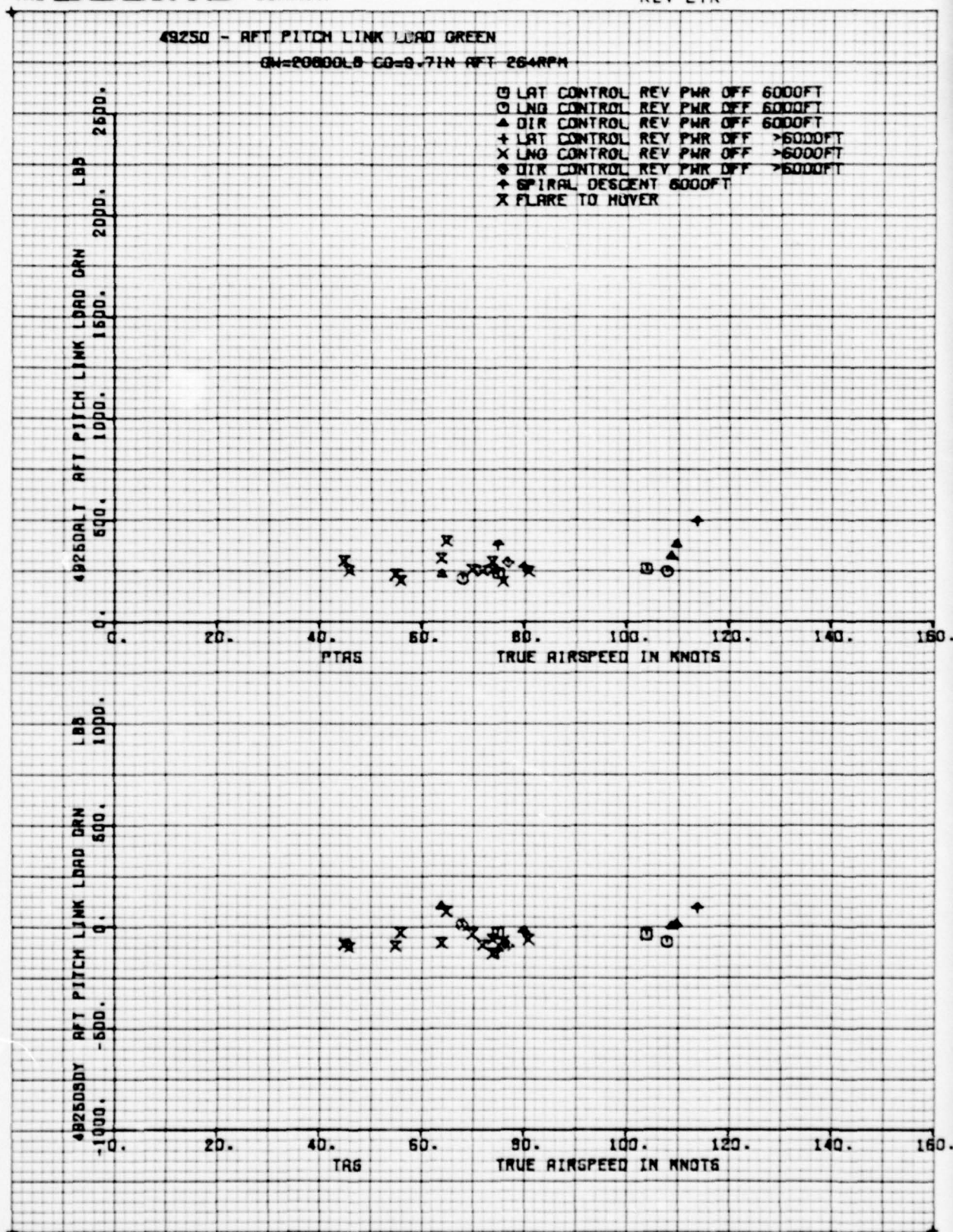


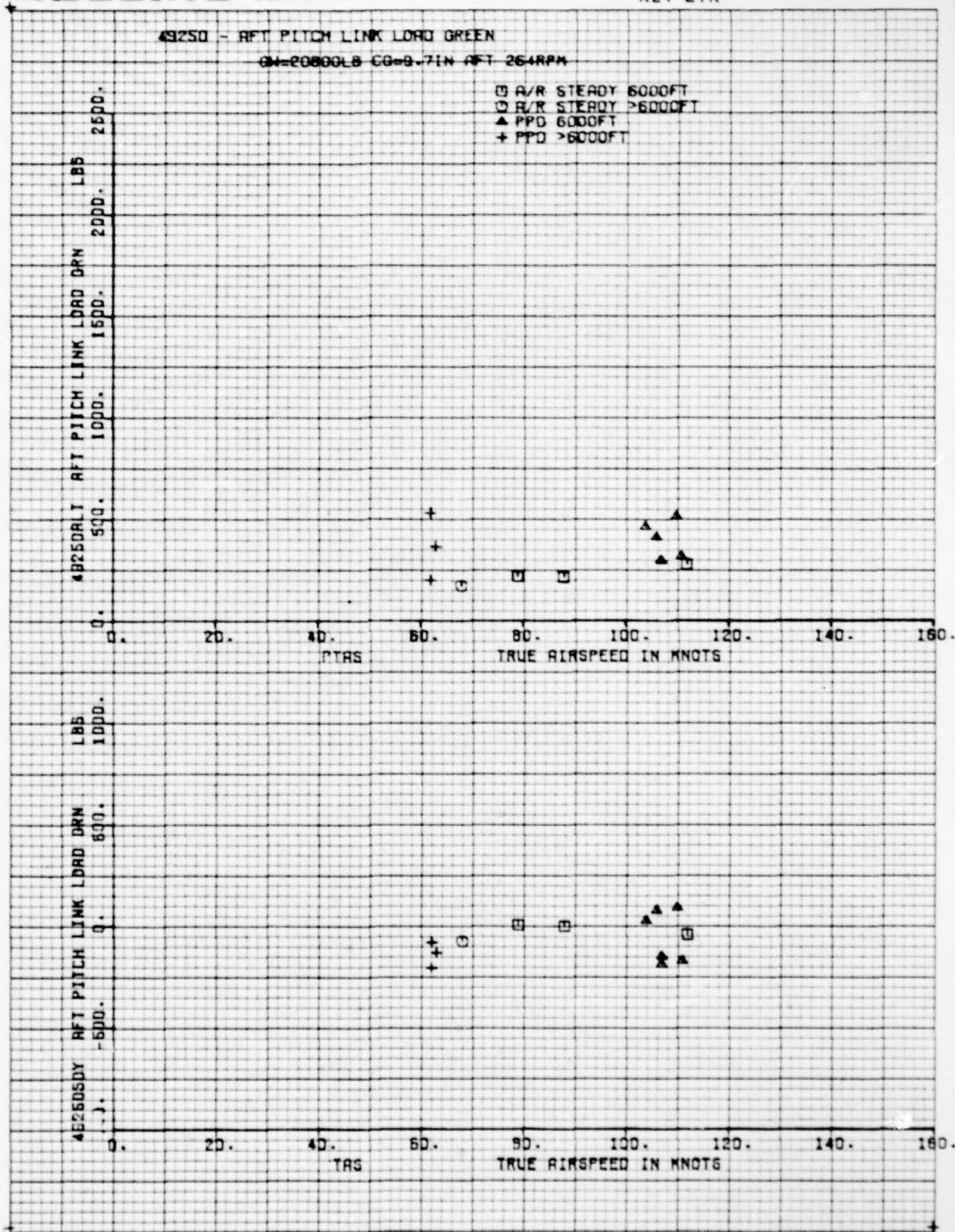
THE **BOEING** COMPANYNUMBER 1 VOLUME 7
REV LTR

FORM 52300 (10/71)

SHEET 37

-20



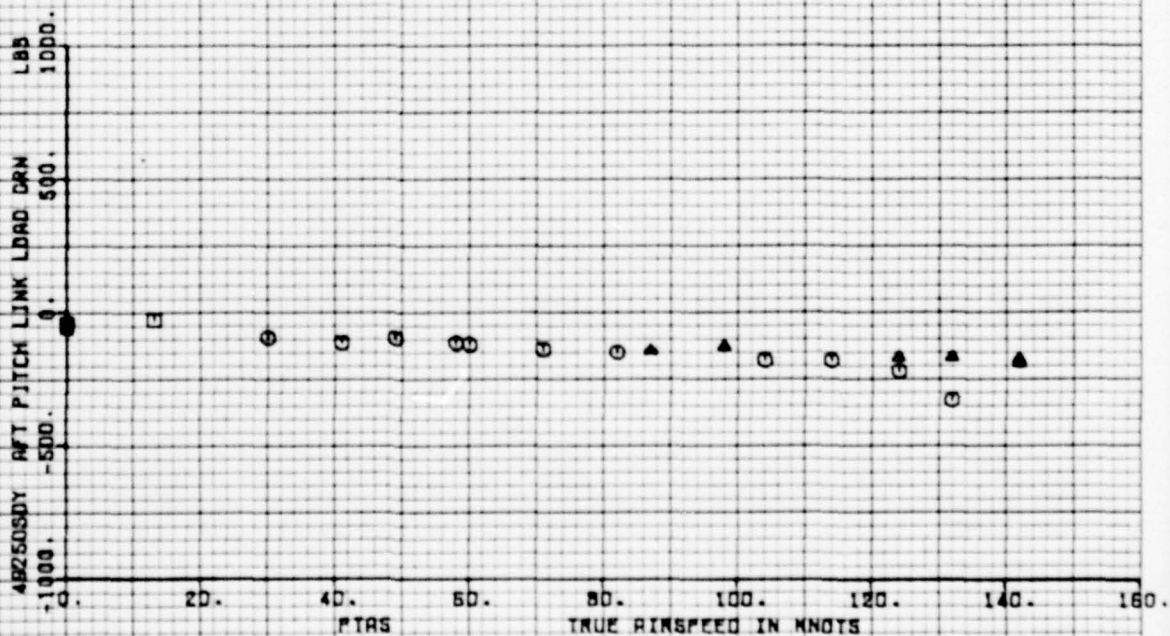
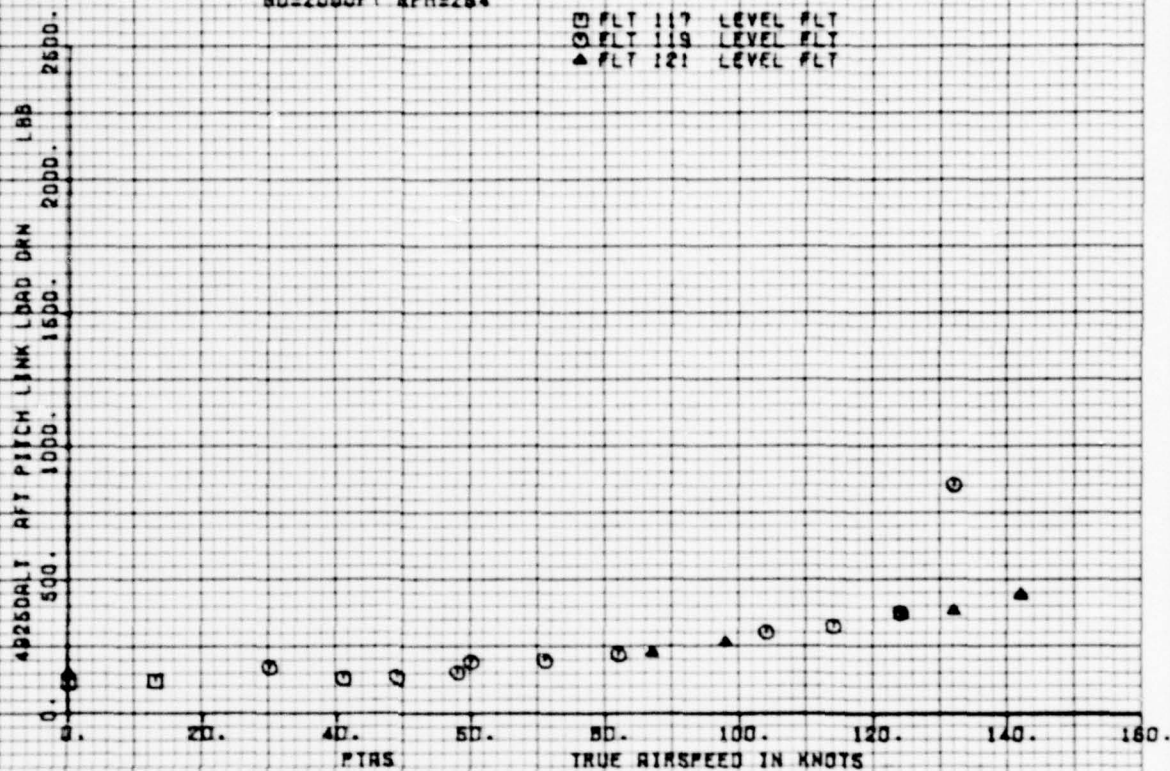


THE **BOEING** COMPANY

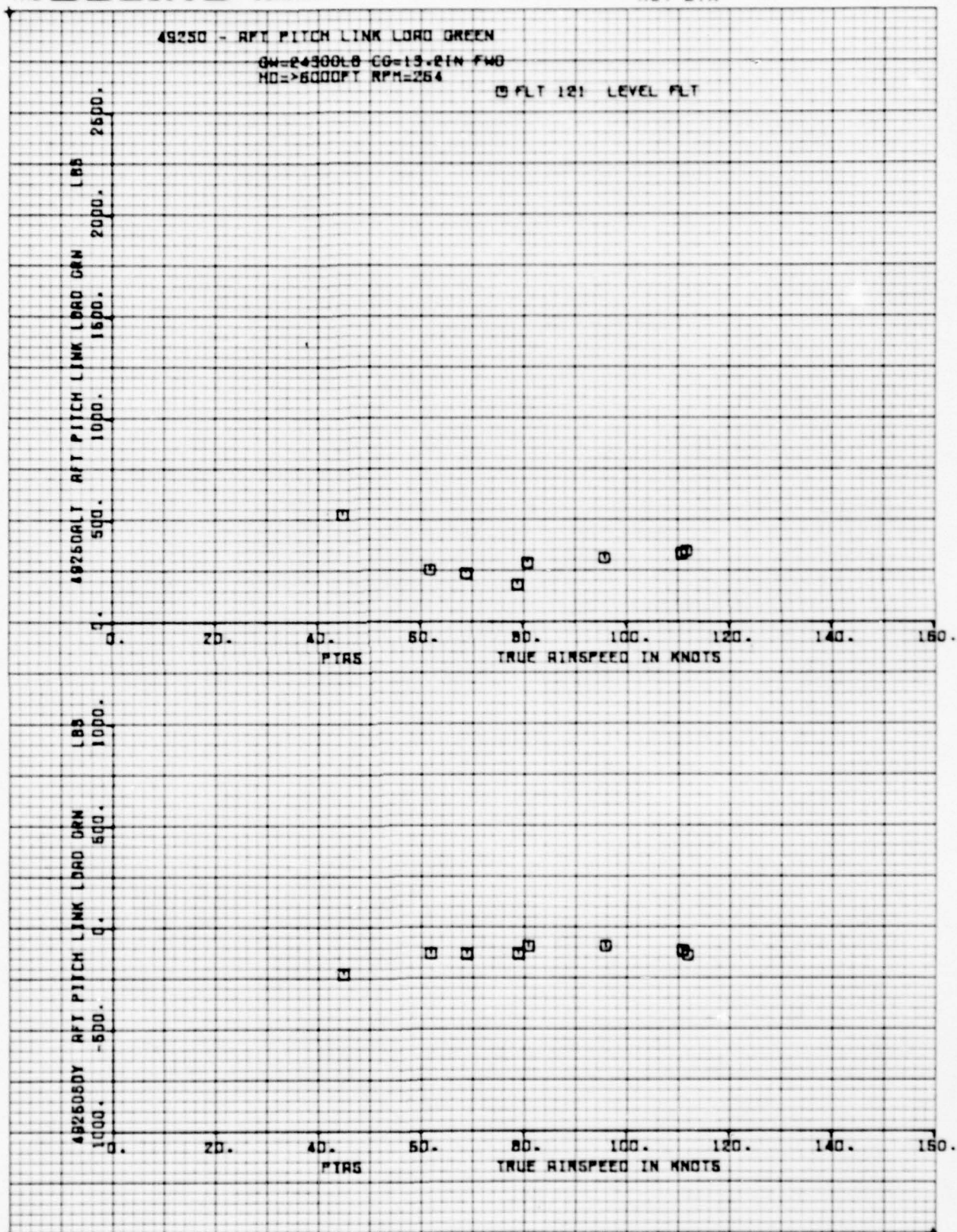
19250 - AFT PITCH LINK LOAD GREEN

OW=24300LB CO=19.2IN FWD
BD=2000FT RPM=284

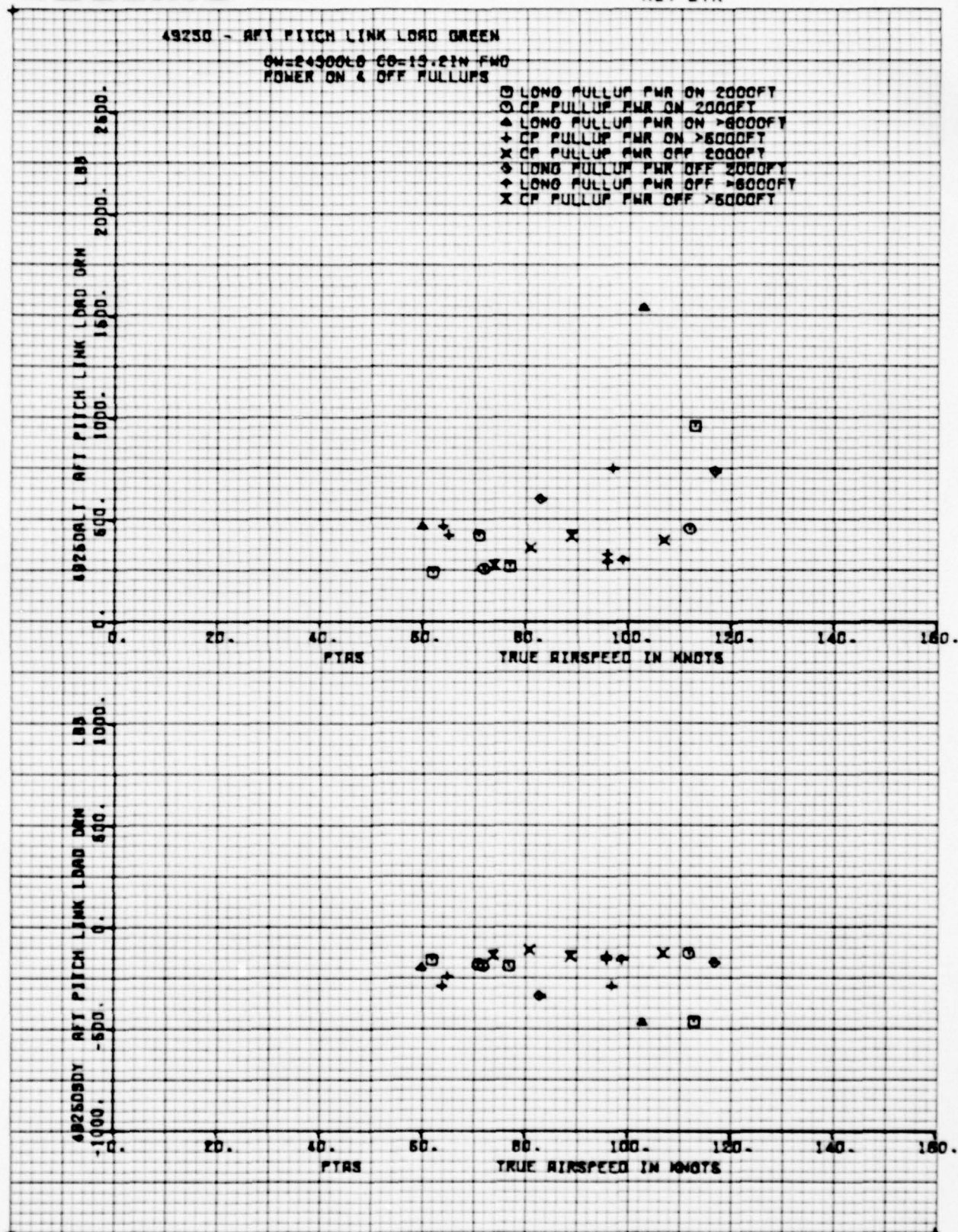
□	FLT 117	LEVEL FLT
○	FLT 119	LEVEL FLT
▲	FLT 121	



FORM 82300 (10/71)

THE **BOEING** COMPANY

FORM 52300 (10/71)

THE **BOEING** COMPANY

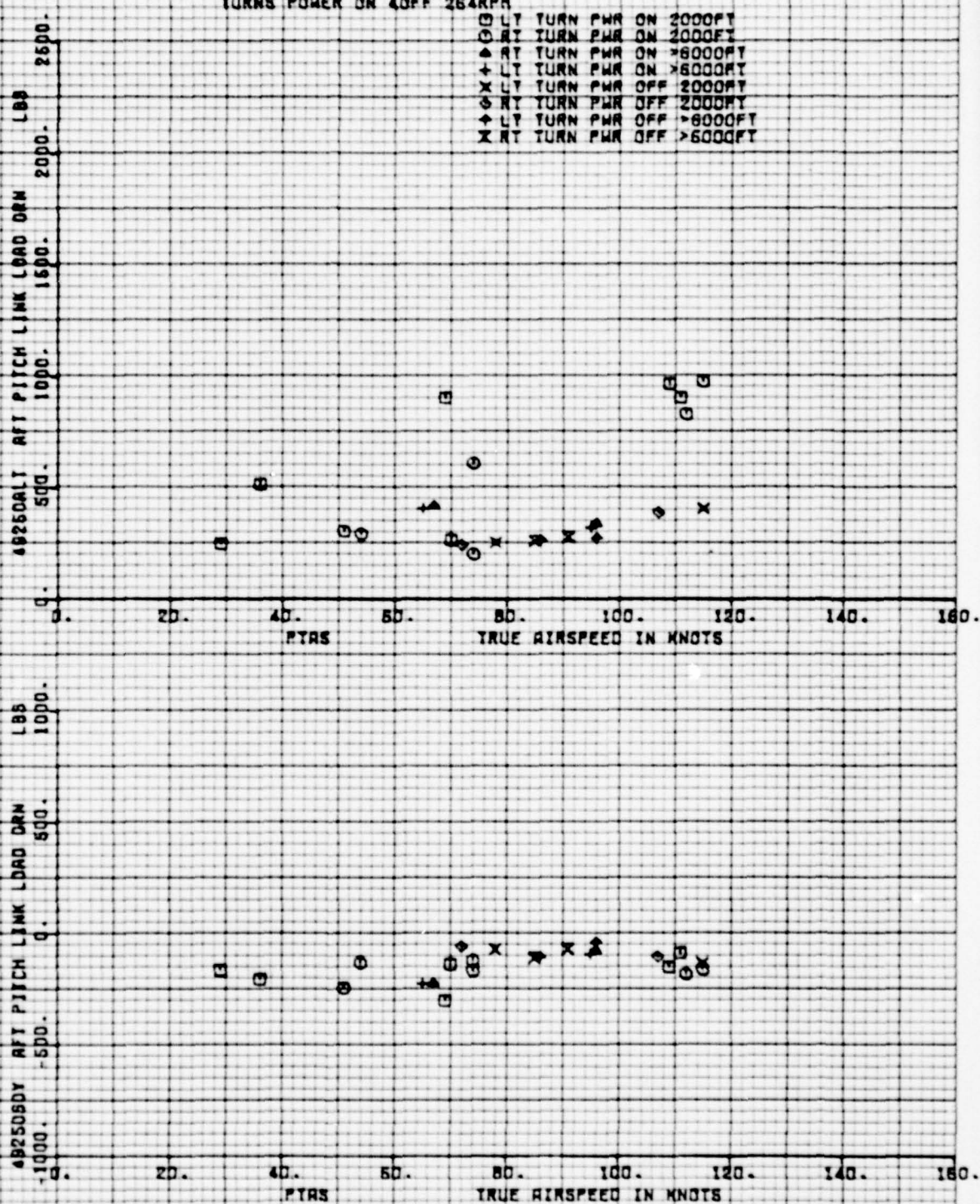
FORM 52300 (10/71)

THE **BOEING** COMPANY

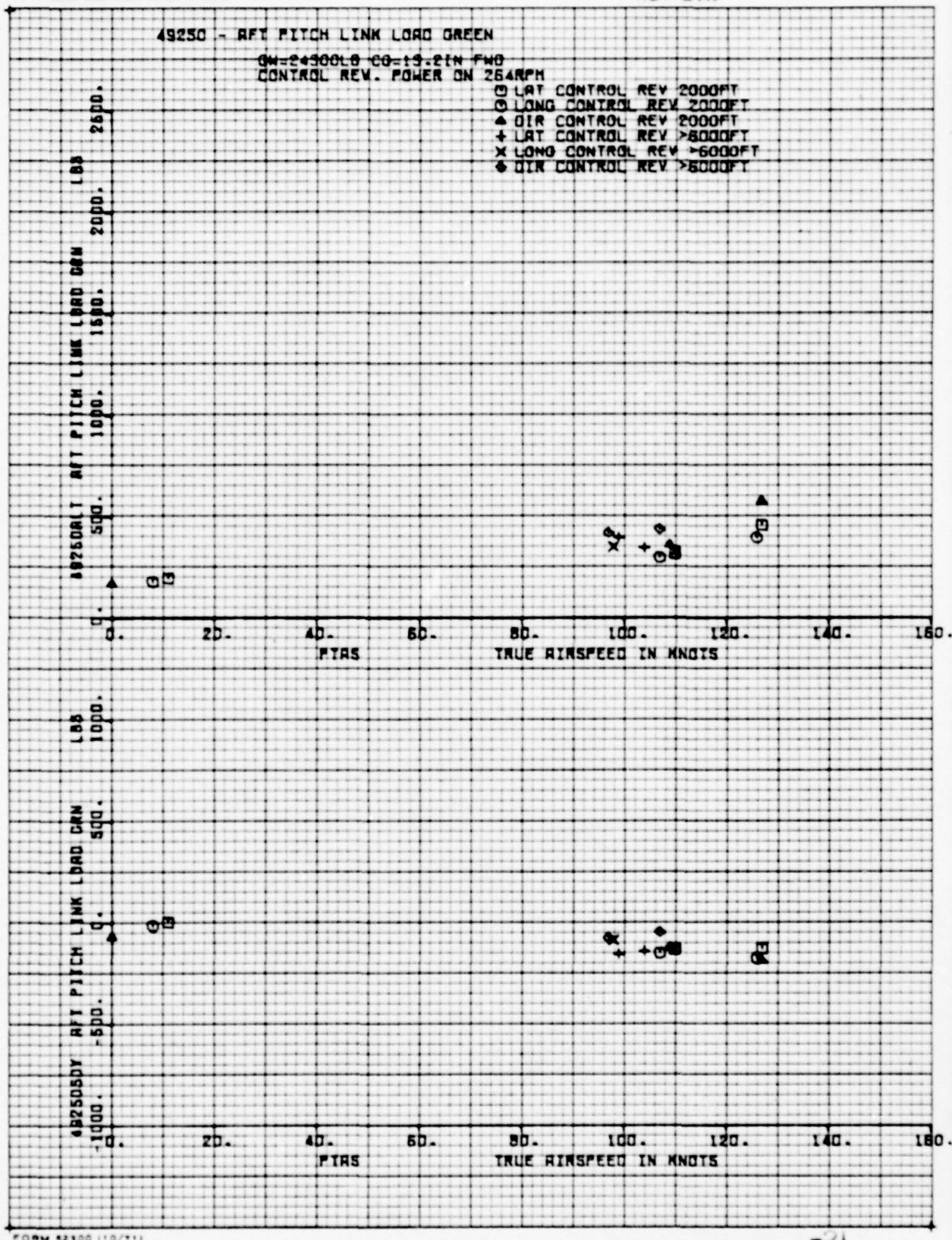
49250 - AFT PITCH LINK LOAD GREEN

GW=24300LB CG=19.21N FWD
TURNS POWER ON 40FF 264RPM

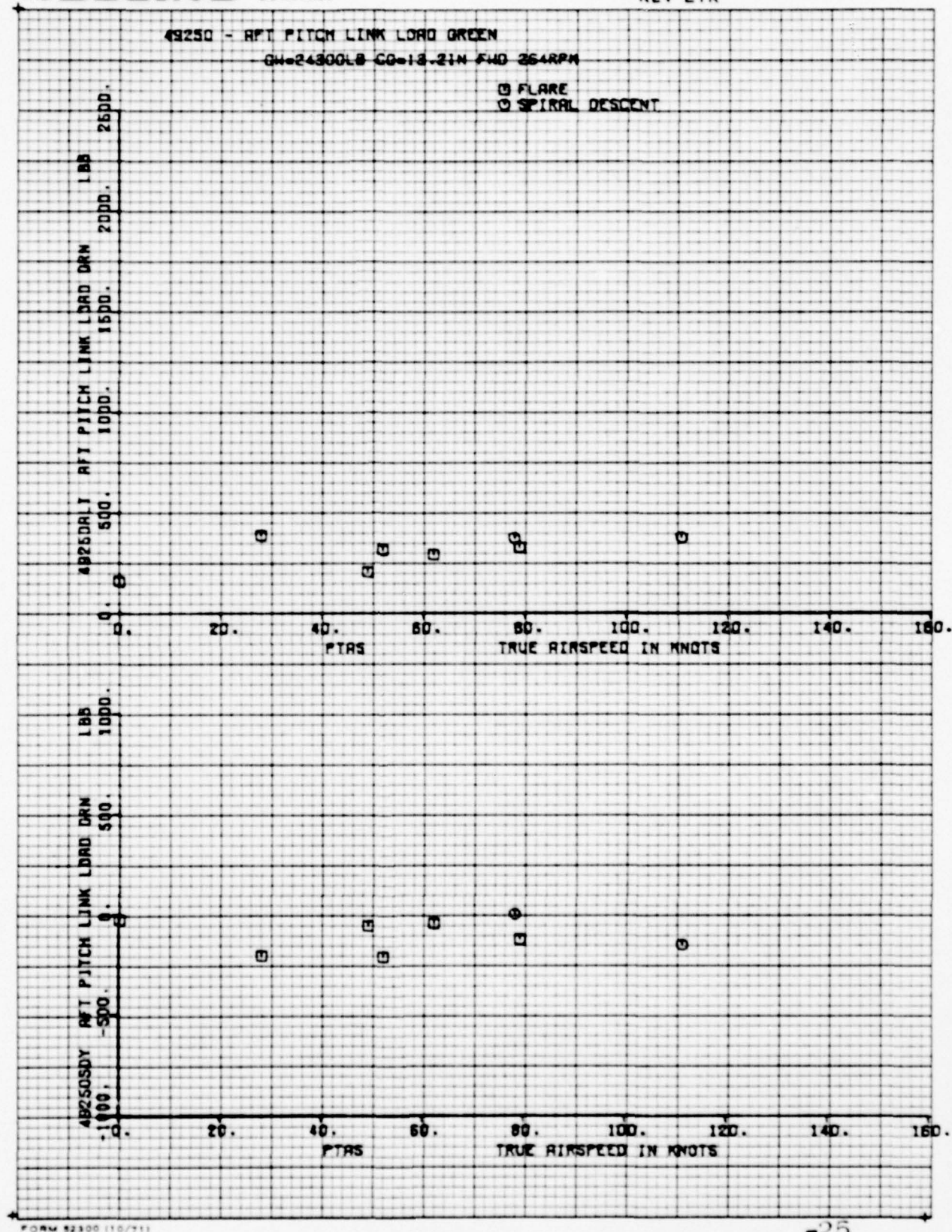
O LT TURN PWR ON 2000FT
 O RT TURN PWR ON 2000FT
 A RT TURN PWR ON >6000FT
 + LT TURN PWR ON >6000FT
 X LT TURN PWR OFF 2000FT
 O RT TURN PWR OFF 2000FT
 + LT TURN PWR OFF >6000FT
 X RT TURN PWR OFF >6000FT



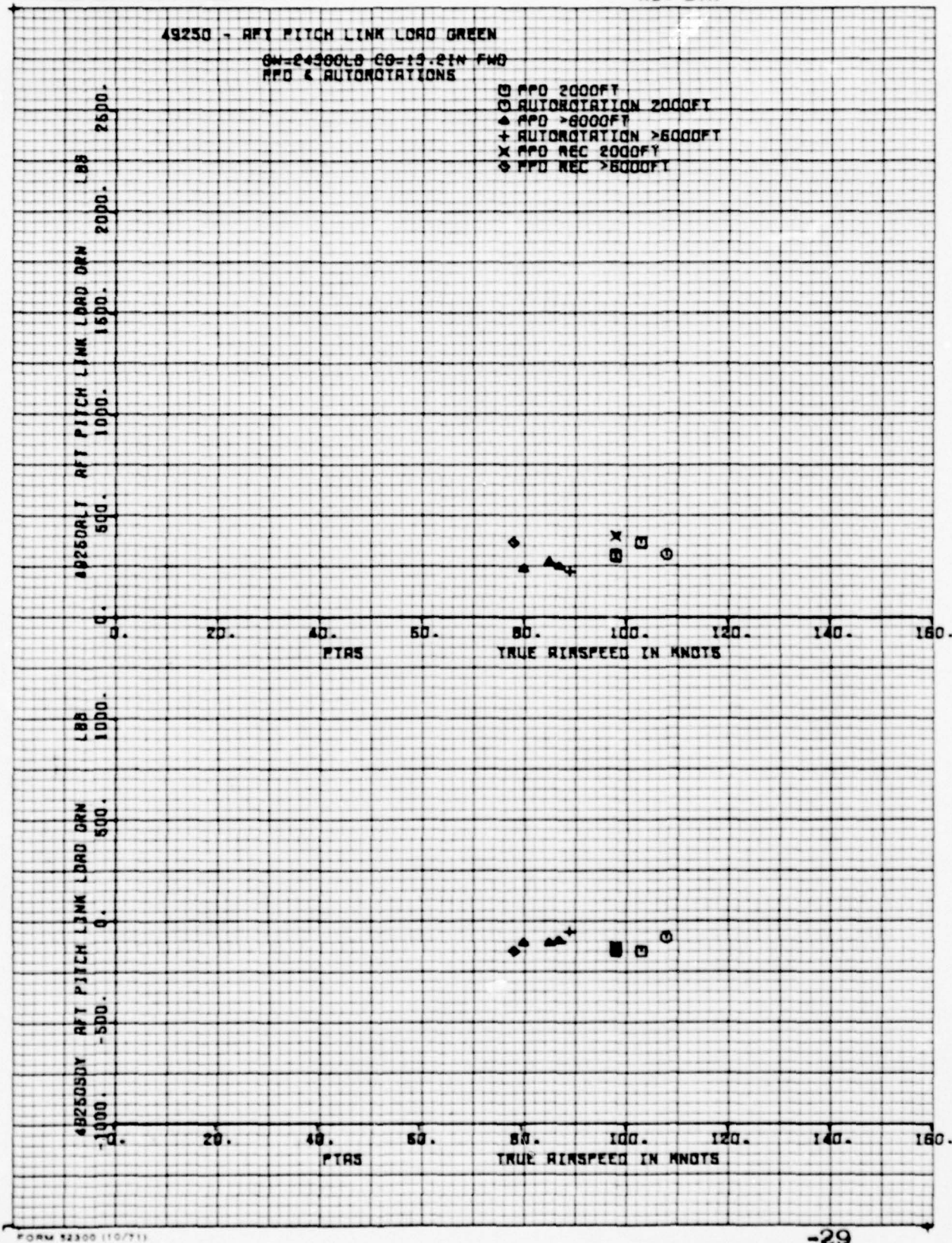
FORM 52300 (10/71)

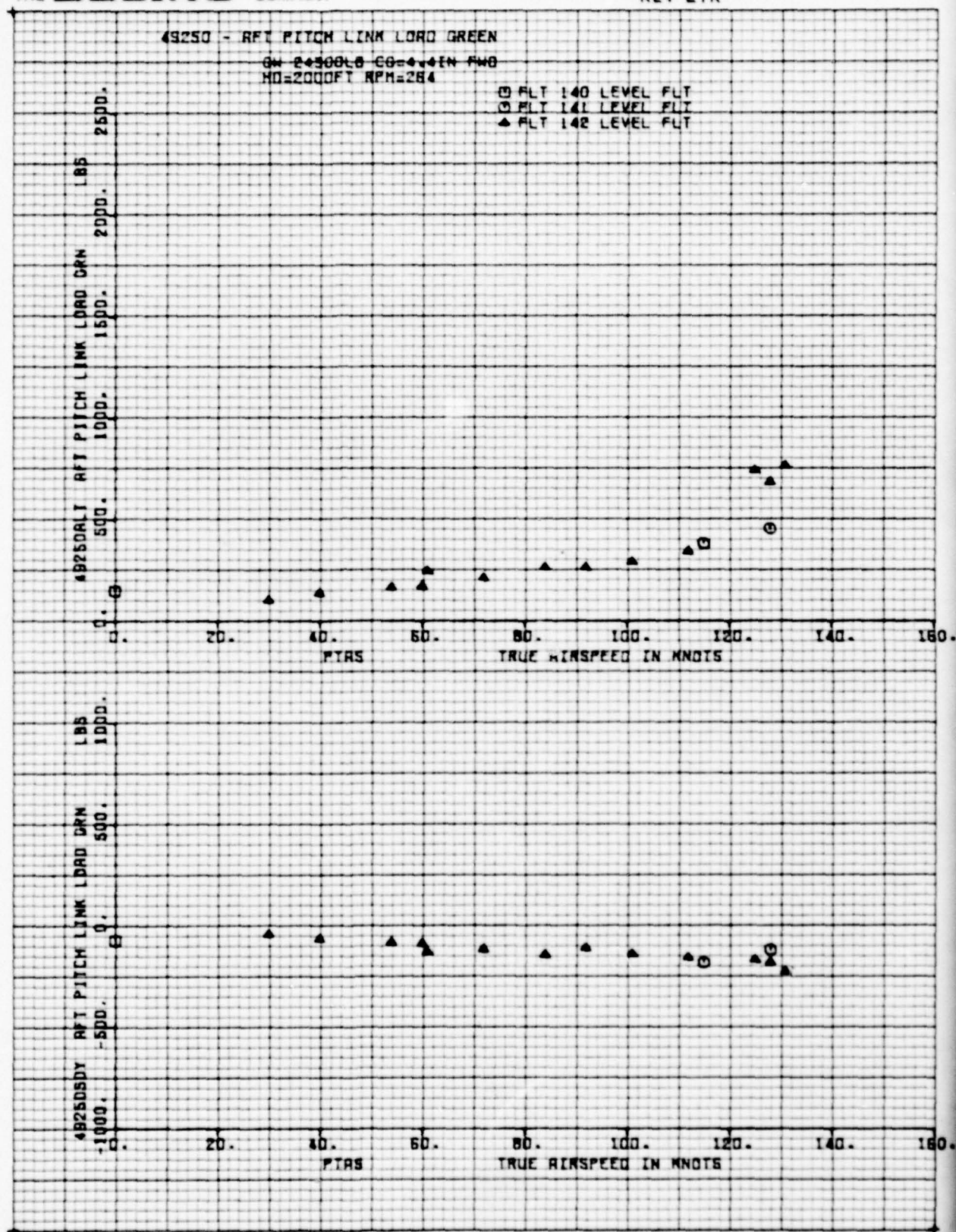


THE **BOEING** COMPANY

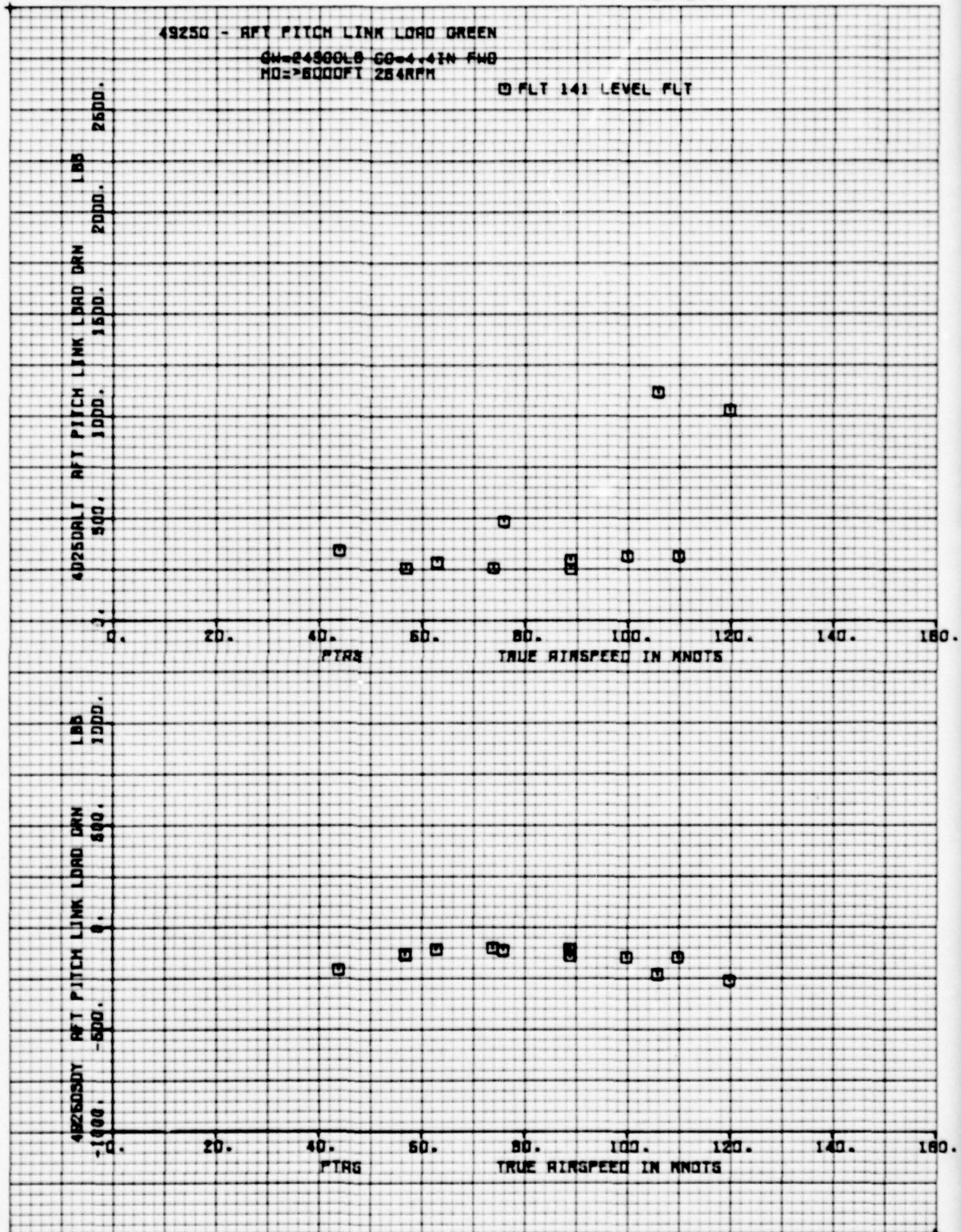


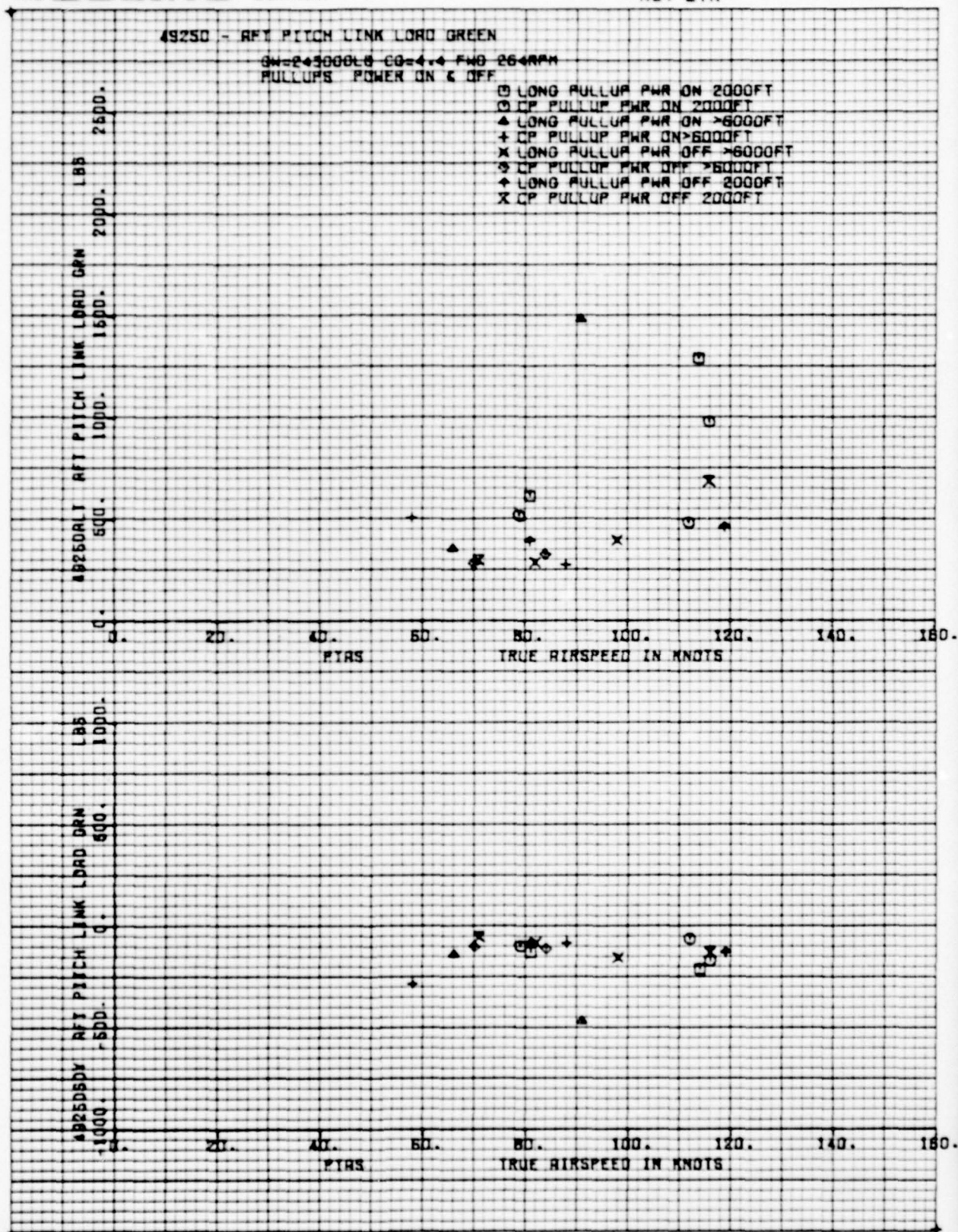
FORM 52300 (11/71)



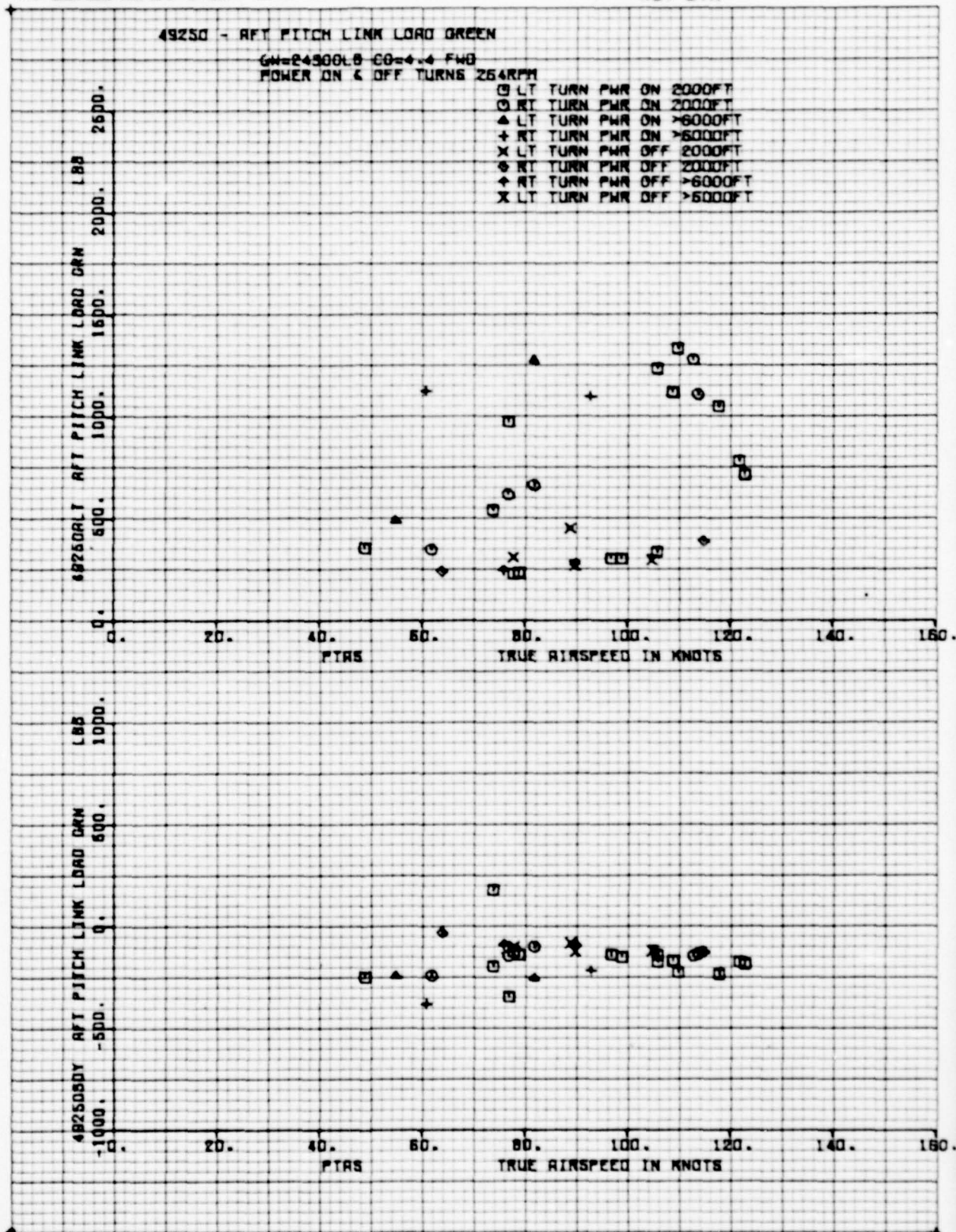
THE **BOEING** COMPANY

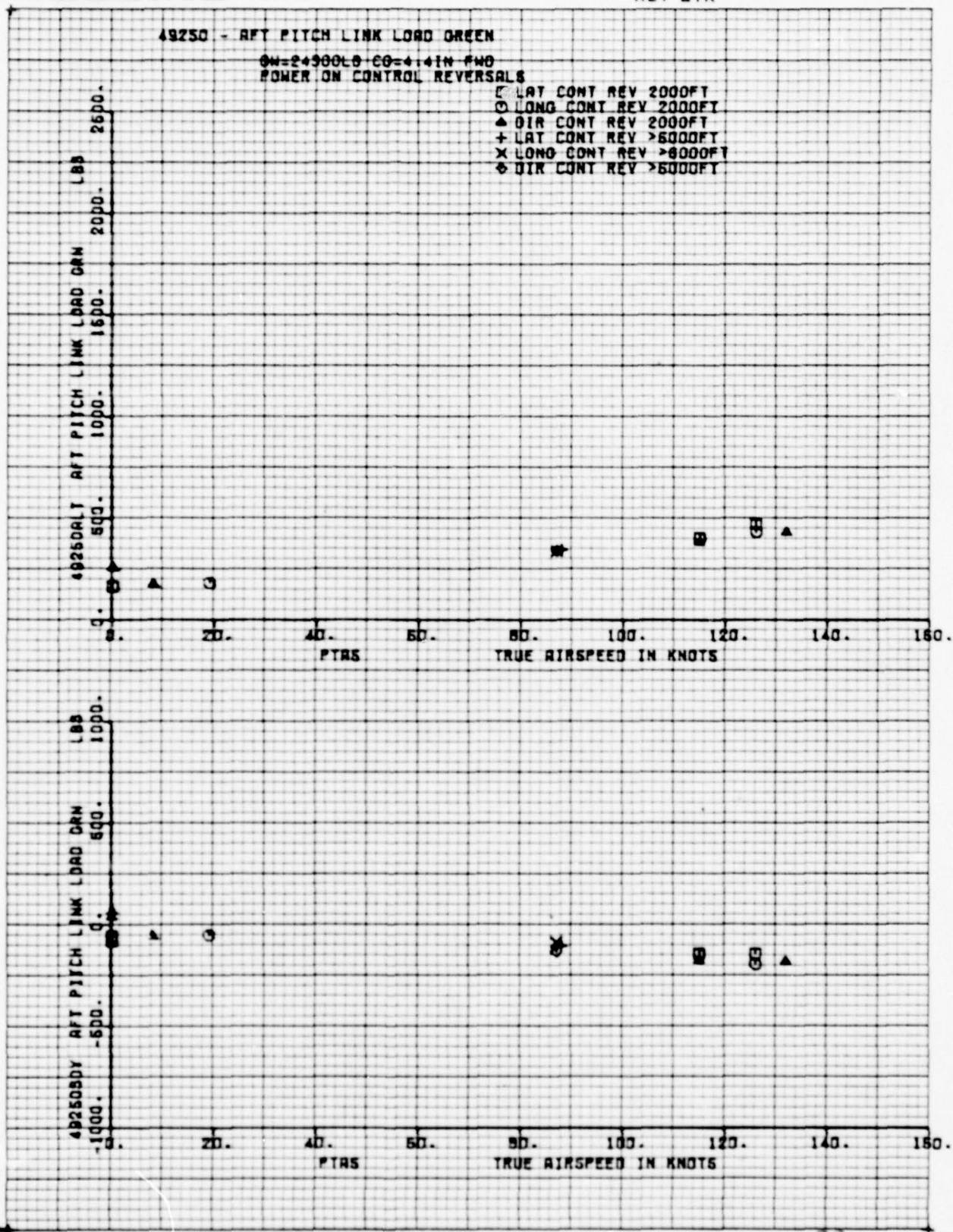
FORM 52300 (10/71)

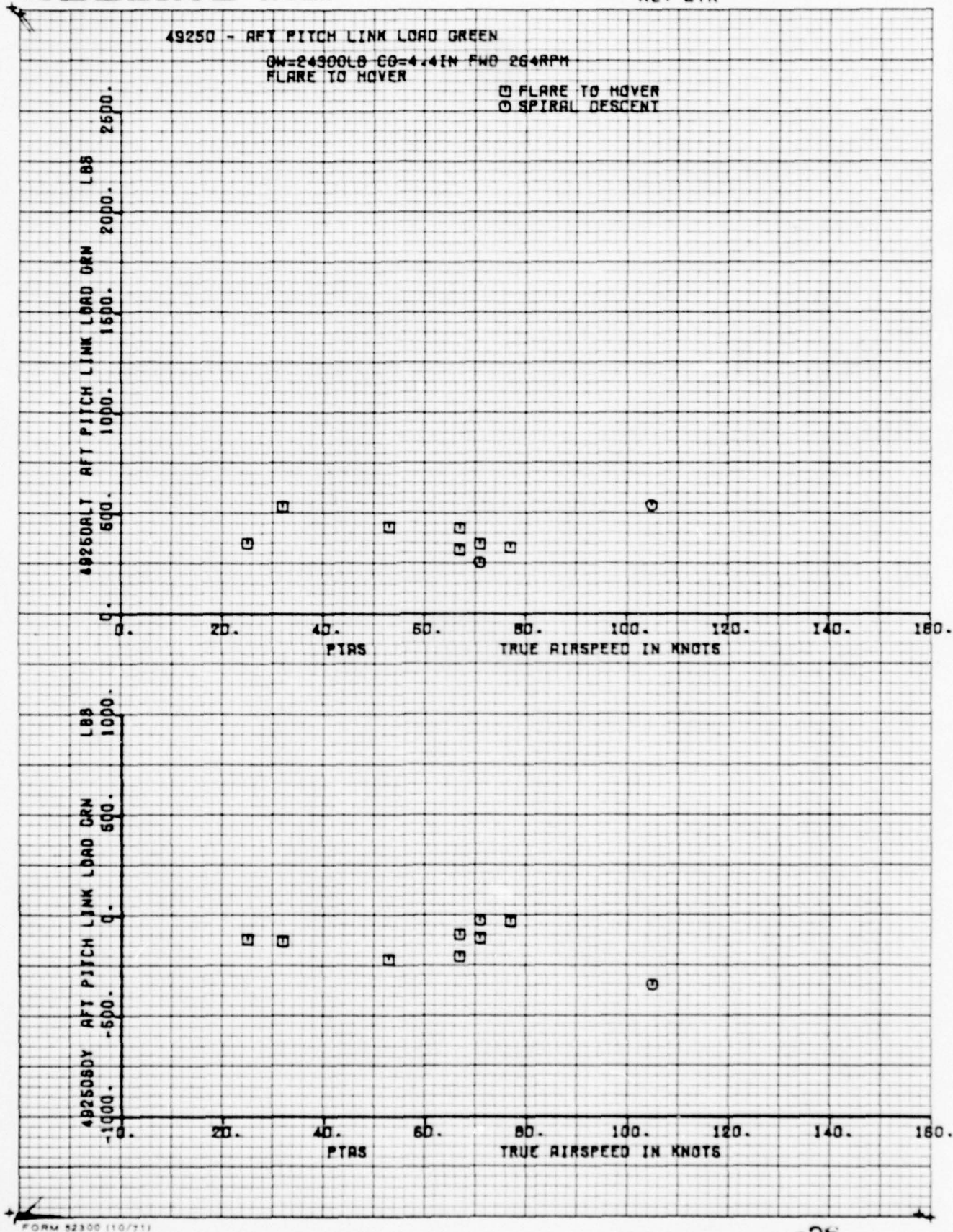


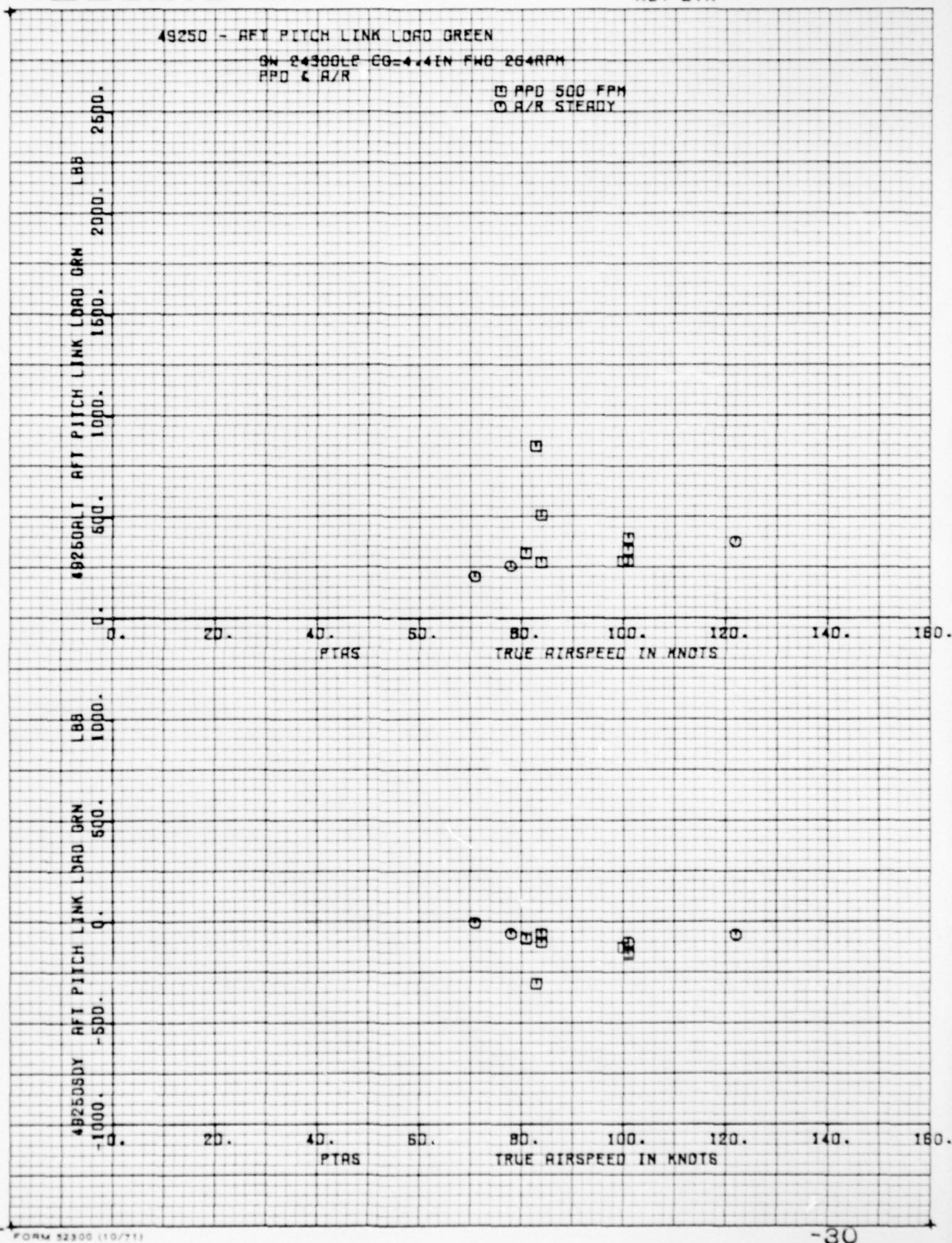


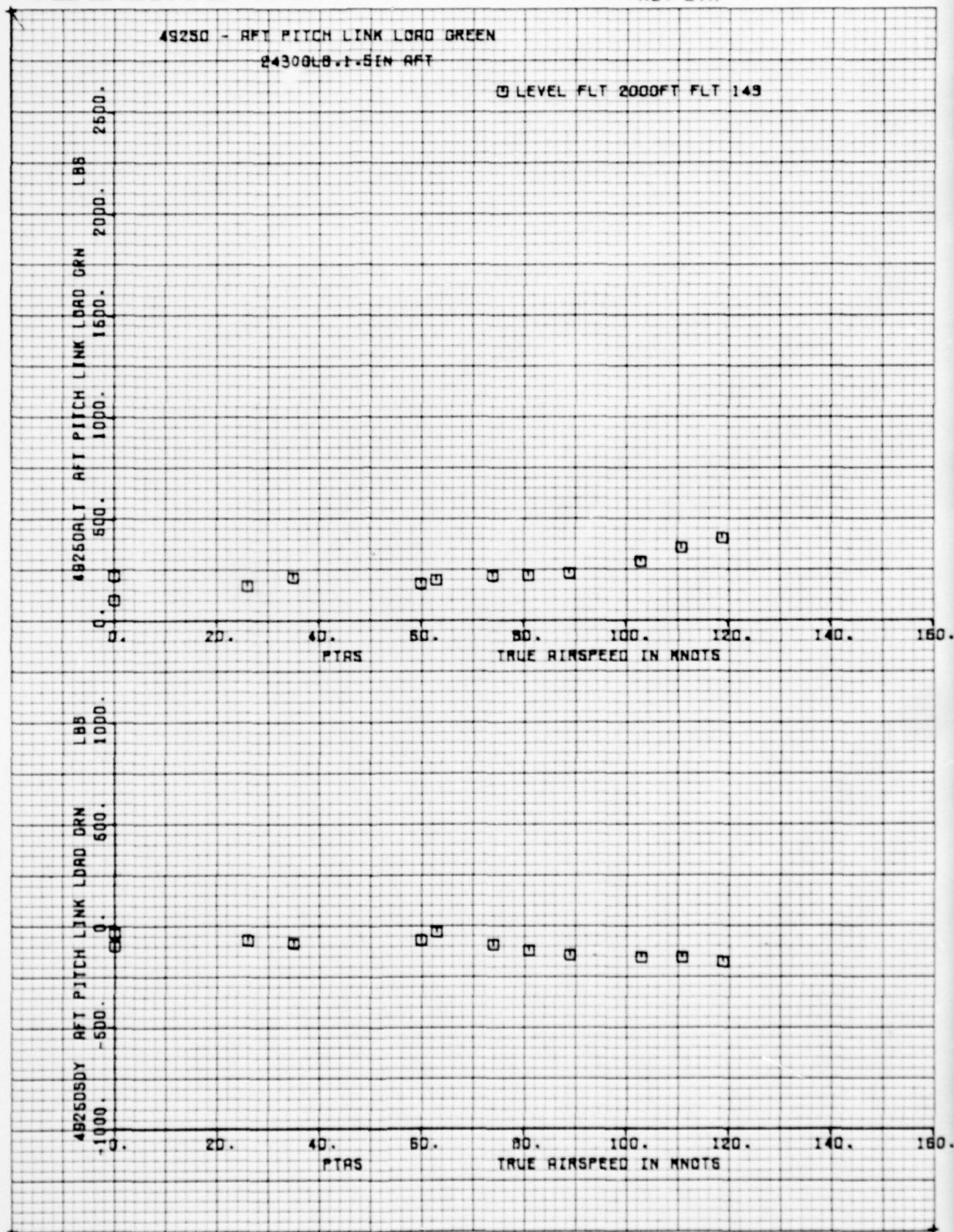
FORM 82300 (10/71)











THE **BOEING** COMPANY

PREPARED BY: J. Bendo

CHECKED BY:

DATE: 8/28/78

NUMBER D210-11168-3

REV LTR Volume 7

MODEL NO.

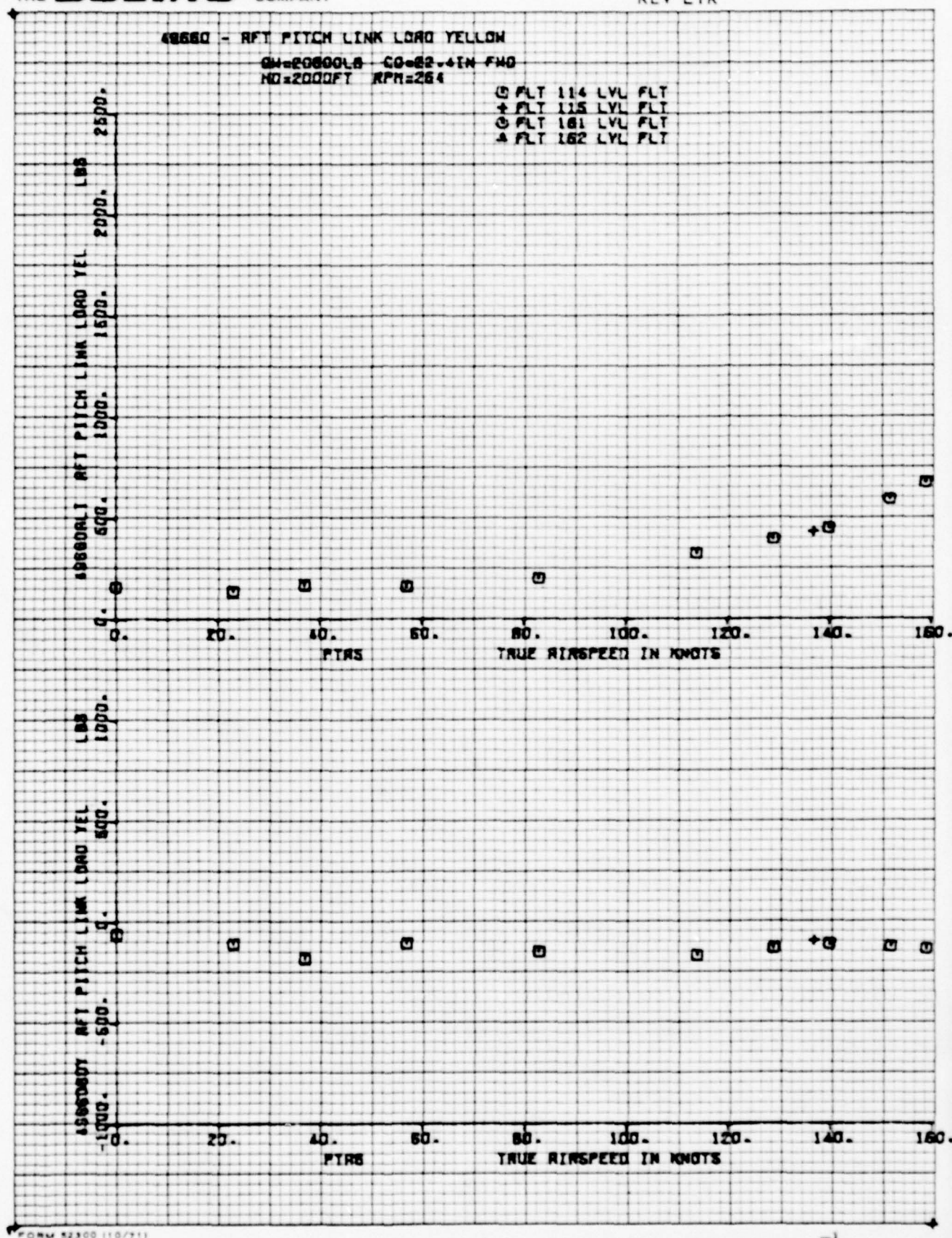
4.2 Aft Pitch Link, Yellow Blade

THE **BOEING** COMPANY

48680 - RFT PITCH LINK LOAD YELLOW

GW=20800LB CG=82.4IN FWD
HD=2000FT RPM=264

O FLT 114 LVL FLT
 + FLT 115 LVL FLT
 O FLT 161 LVL FLT
 A FLT 162 LVL FLT

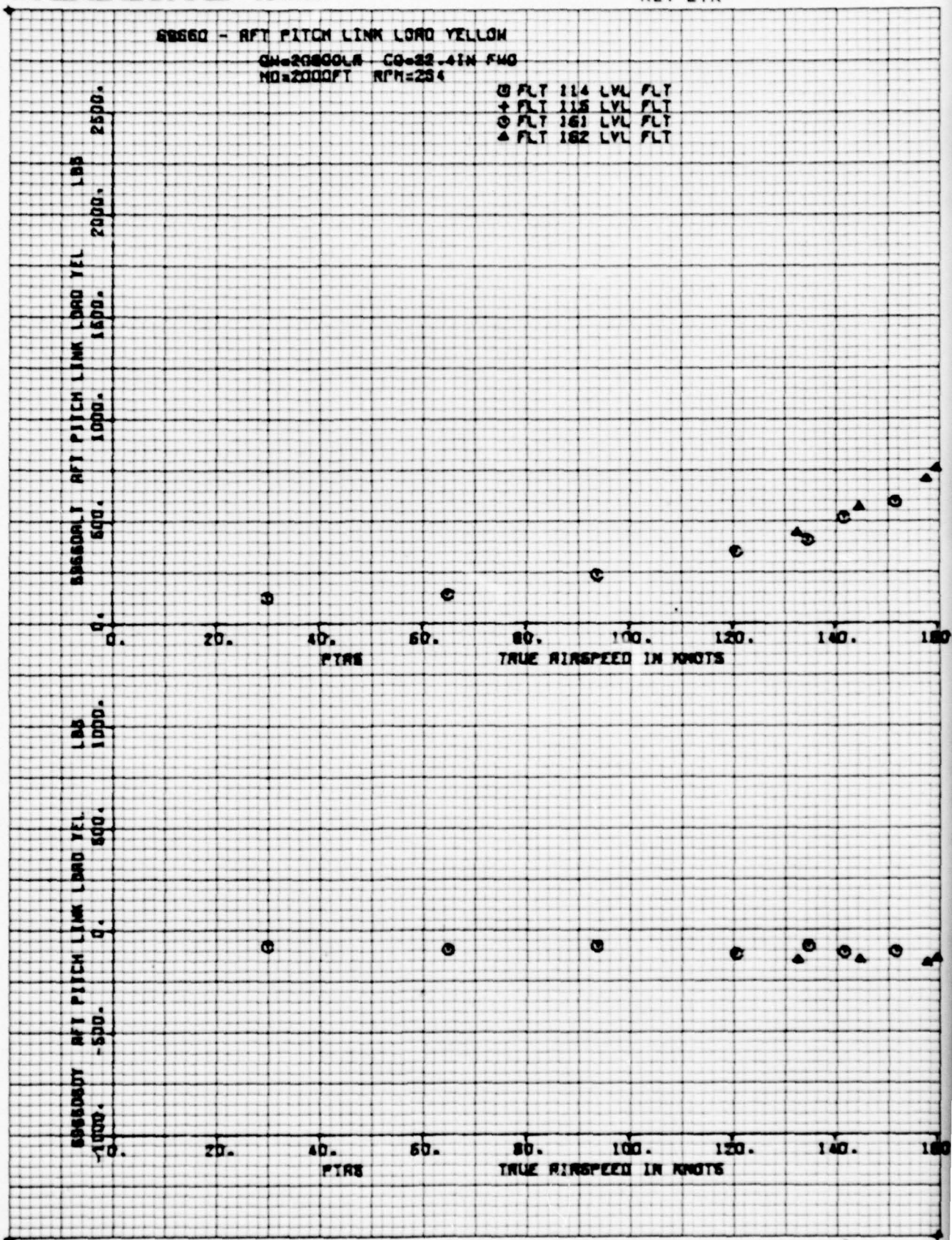


FORM 52300 (10/71)

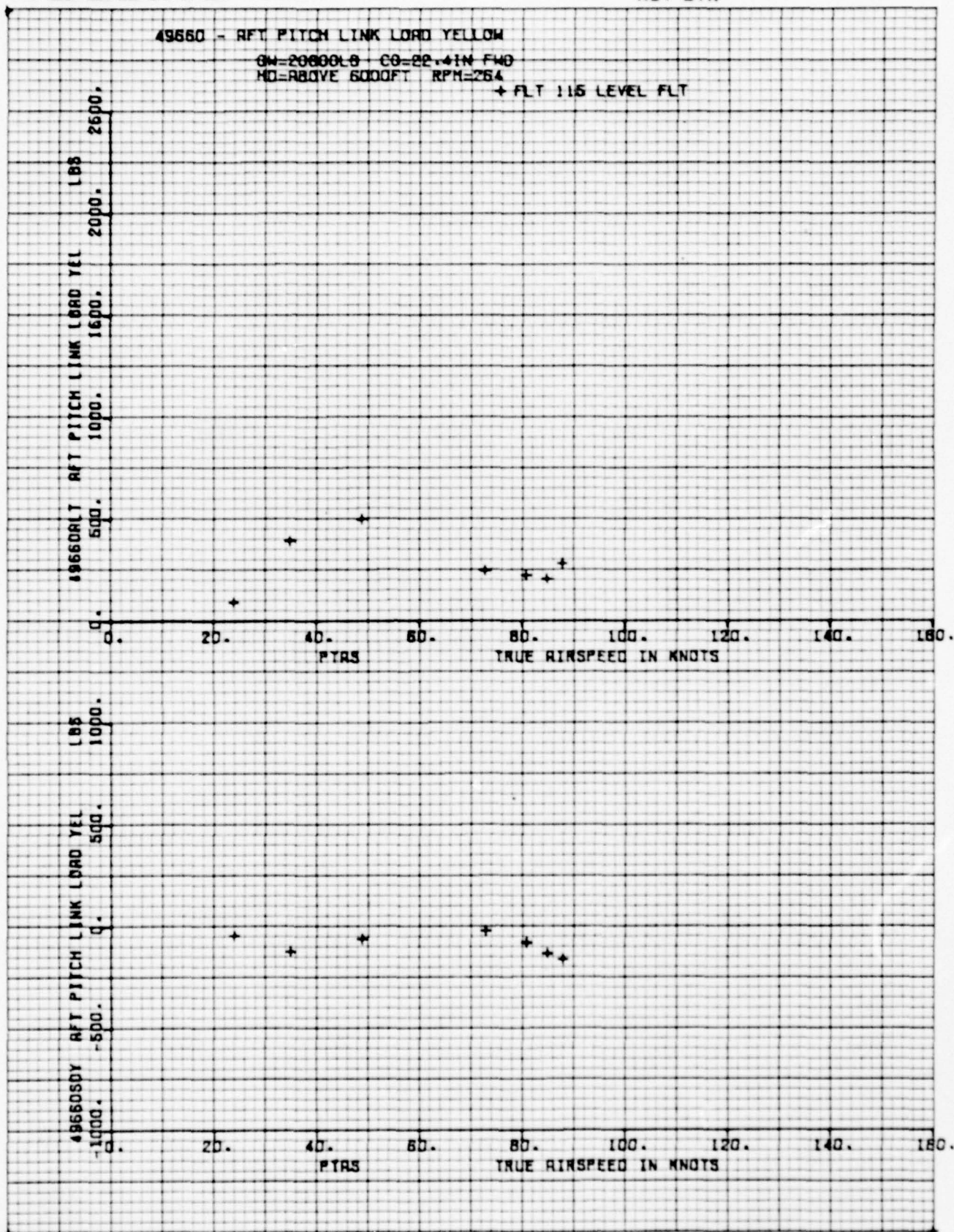
88560 - AFT PITCH LINK LOAD YELLOW

SN=20800LS CO=32-4IN FWD
MO=2000FT RPM=284

⊖ FLT 114 LVL FLT
+ FLT 115 LVL FLT
⊙ FLT 161 LVL FLT
▲ FLT 182 LVL FLT



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NUMBER
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THE **BOEING** COMPANY

49660 - AFT PITCH LINK LOAD YELLOW

CH-20800LB CO-22.4IN FWD RPM-284

O CP PULLUP PWR ON >6000FT
 O UNQ PULLUP PWR ON >6000FT
 A CP PULLUP PWR ON 2000FT
 + UNQ PULLUP PWR ON 2000FT
 X UNQ PULLUP PWR OFF 2000FT
 O CP PULLUP PWR OFF 2000FT
 A APO RECOVERY >6000FT
 X APO RECOVERY 2000FT

 49660DY AFT PITCH LINK LOAD YEL LBS
 0. 500. 1000. 1500. 2000. 2500.

 20. 40. 60. 80. 100. 120. 140. 160.
 KTAS TRUE AIRSPEED IN KNOTS

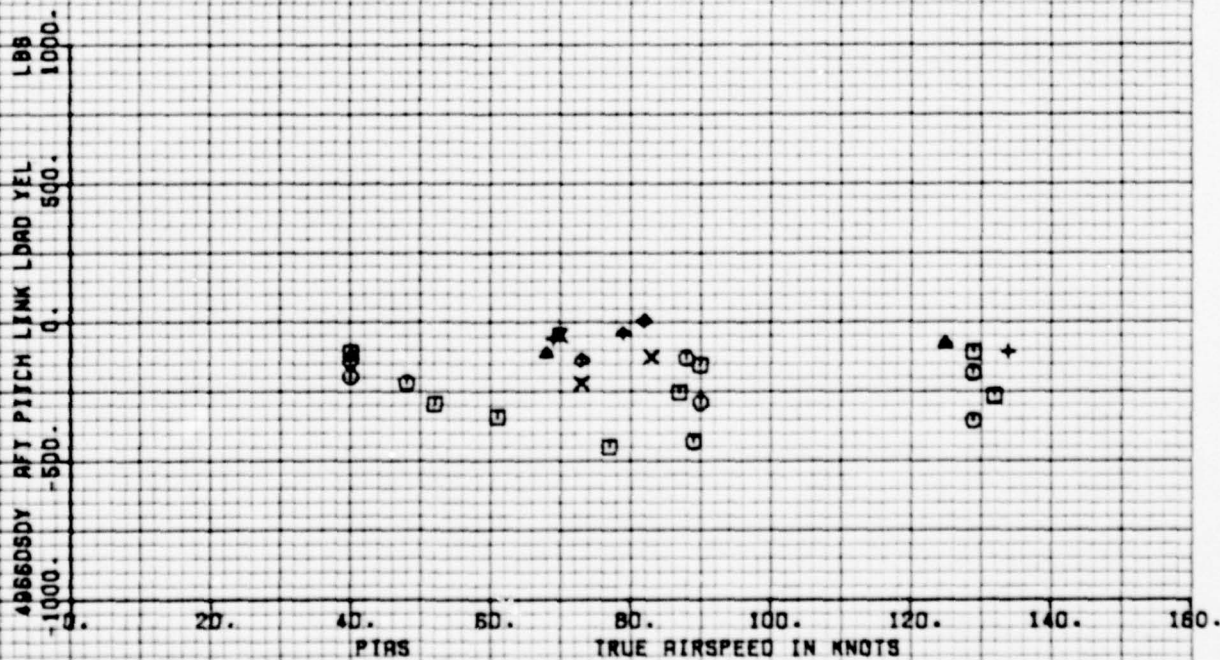
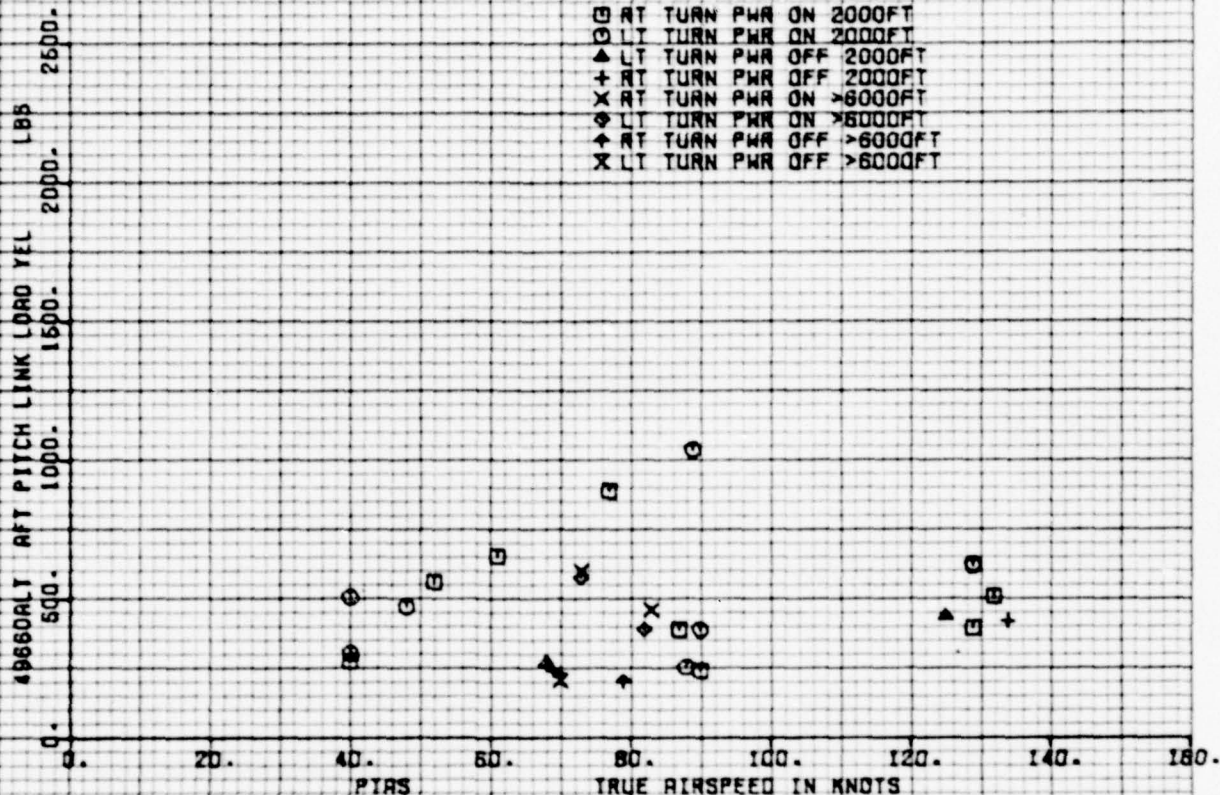
 49660DY AFT PITCH LINK LOAD YEL LBS
 0. 500. 1000.

 20. 40. 60. 80. 100. 120. 140. 160.
 KTAS TRUE AIRSPEED IN KNOTS

49680 - AFT PITCH LINK LOAD YELLOW

GW=20600LB CG=22.4IN FWD RPM=264

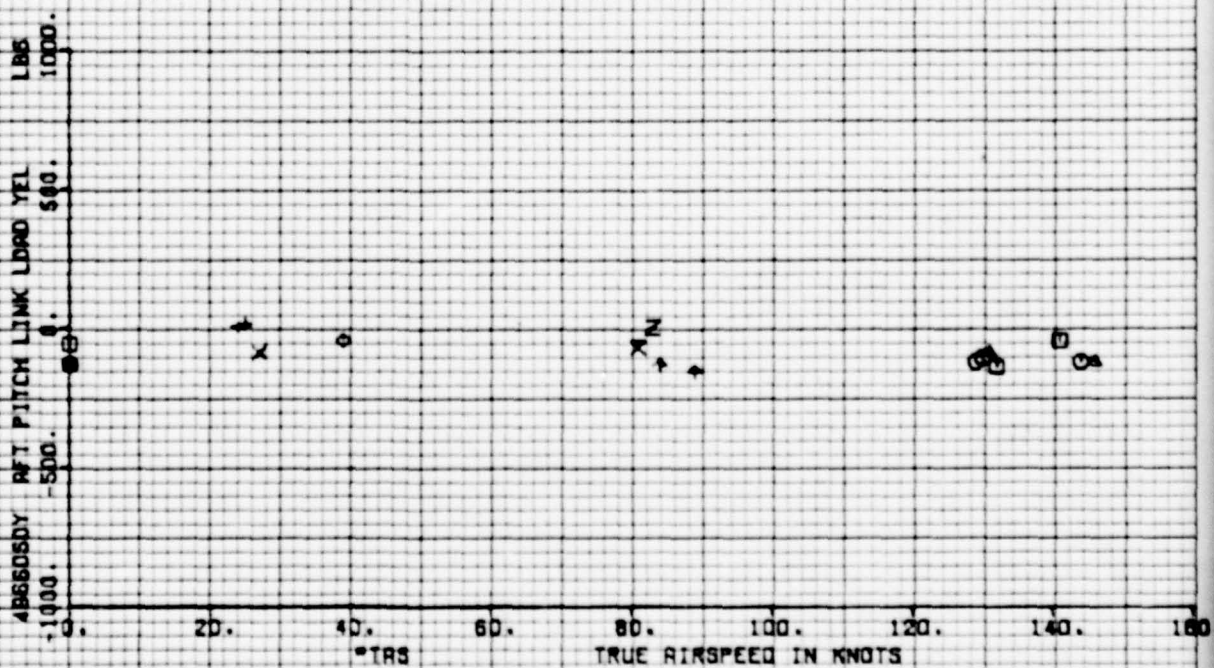
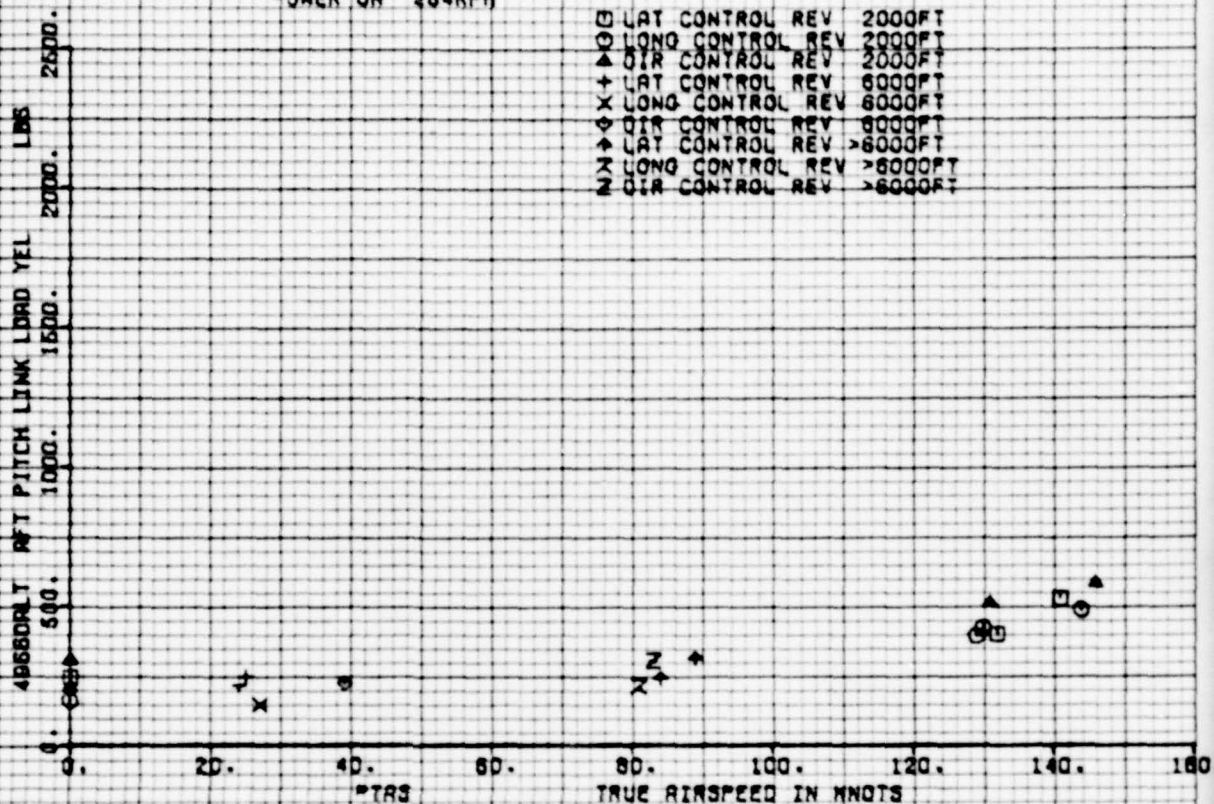
- RT TURN PWR ON 2000FT
- LT TURN PWR ON 2000FT
- △ LT TURN PWR OFF 2000FT
- + RT TURN PWR OFF 2000FT
- × RT TURN PWR ON >6000FT
- ◇ LT TURN PWR ON >6000FT
- ↑ RT TURN PWR OFF >6000FT
- × LT TURN PWR OFF >6000FT



49660 - AFT PITCH LINK LOAD YELLOW

OW-20800LB CO-22-4IN FWD
POWER ON 264RPM

□ LAT CONTROL REV 2000FT
○ LONG CONTROL REV 2000FT
△ QIR CONTROL REV 2000FT
+ LAT CONTROL REV 6000FT
x LONG CONTROL REV 6000FT
◇ QIR CONTROL REV 6000FT
▲ LAT CONTROL REV >6000FT
x LONG CONTROL REV >6000FT
z QIR CONTROL REV >6000FT

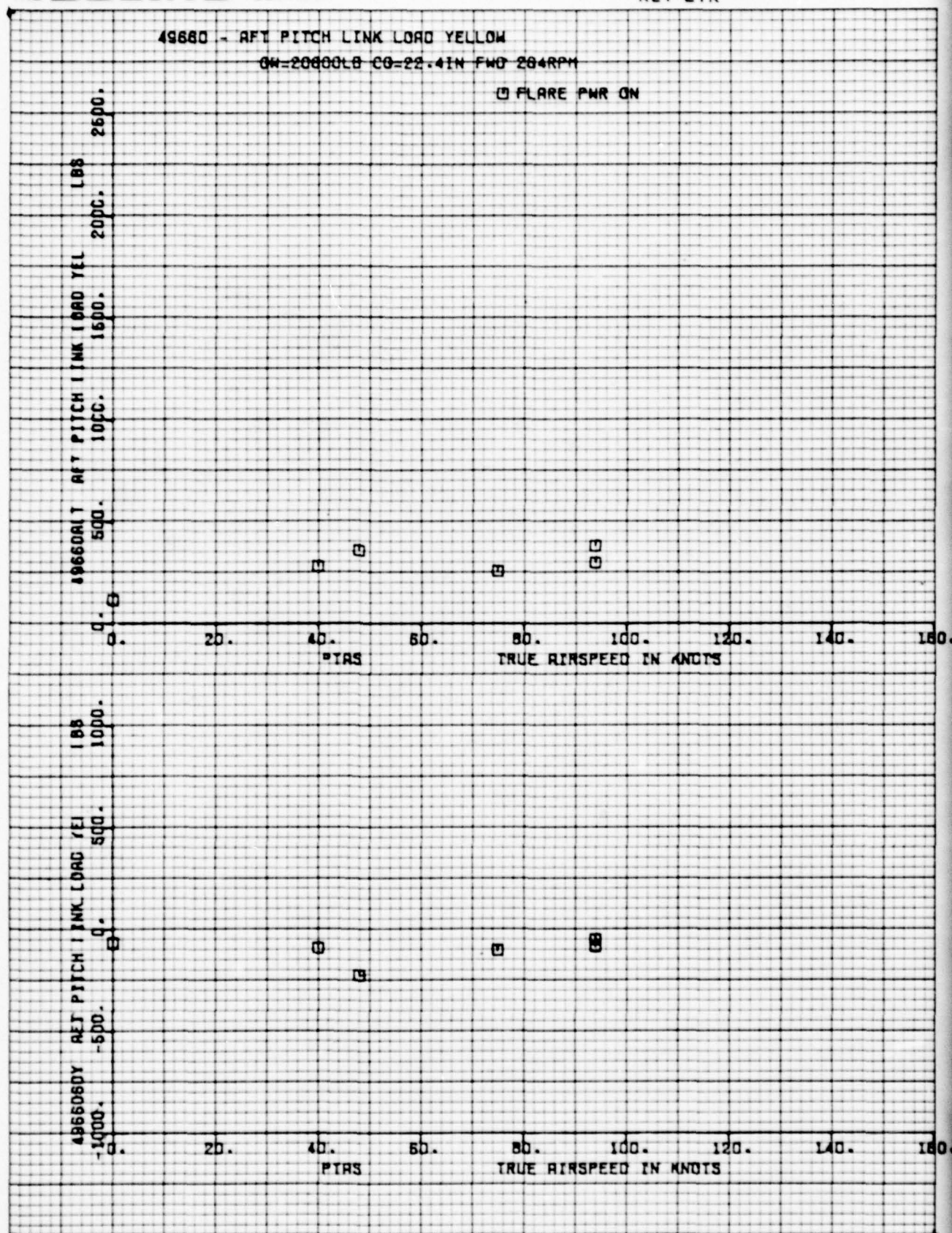


THE **BOEING** COMPANY

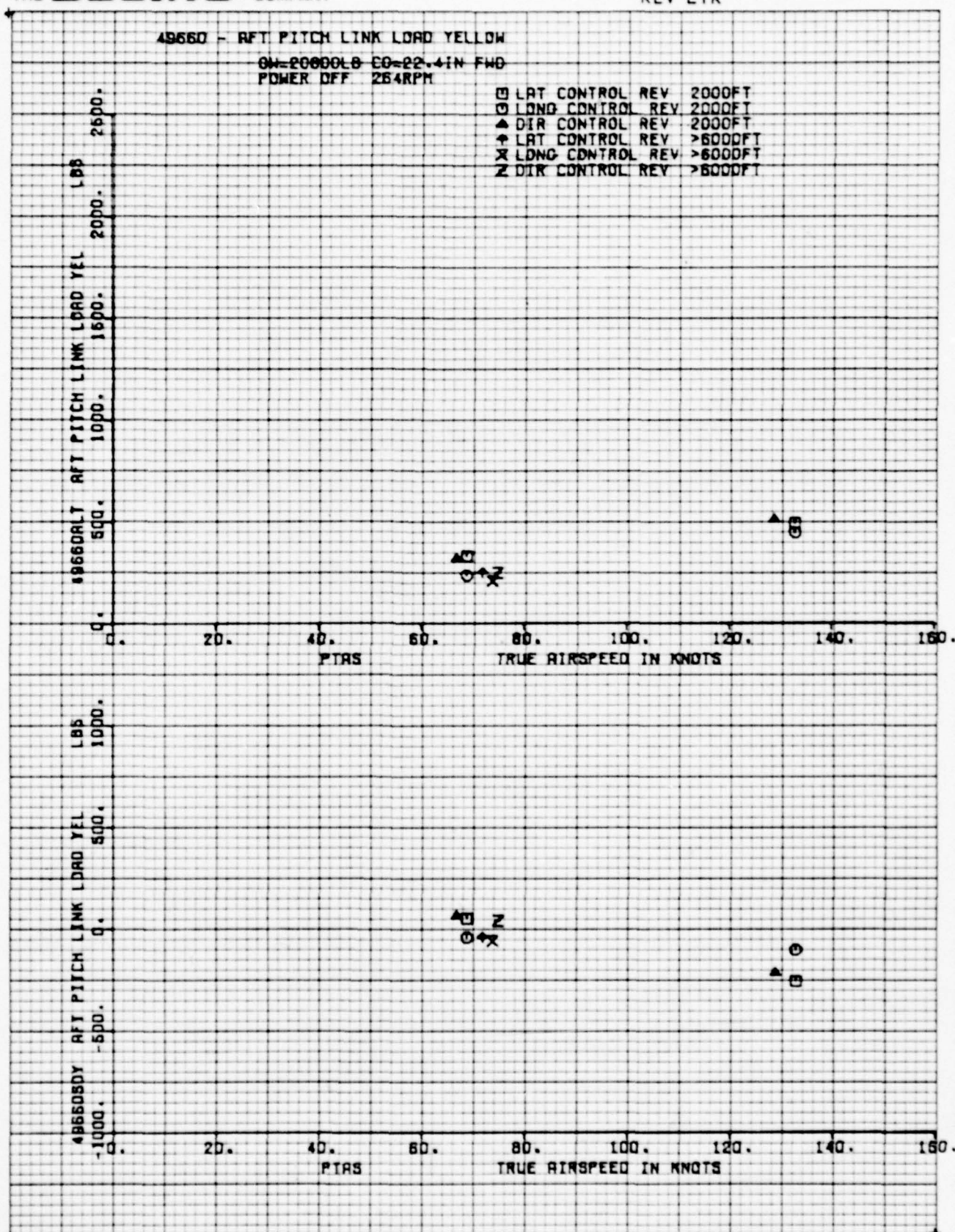
49660 - AFT PITCH LINK LOAD YELLOW

GW=20800LB CG=22.4IN FWD 284RPM

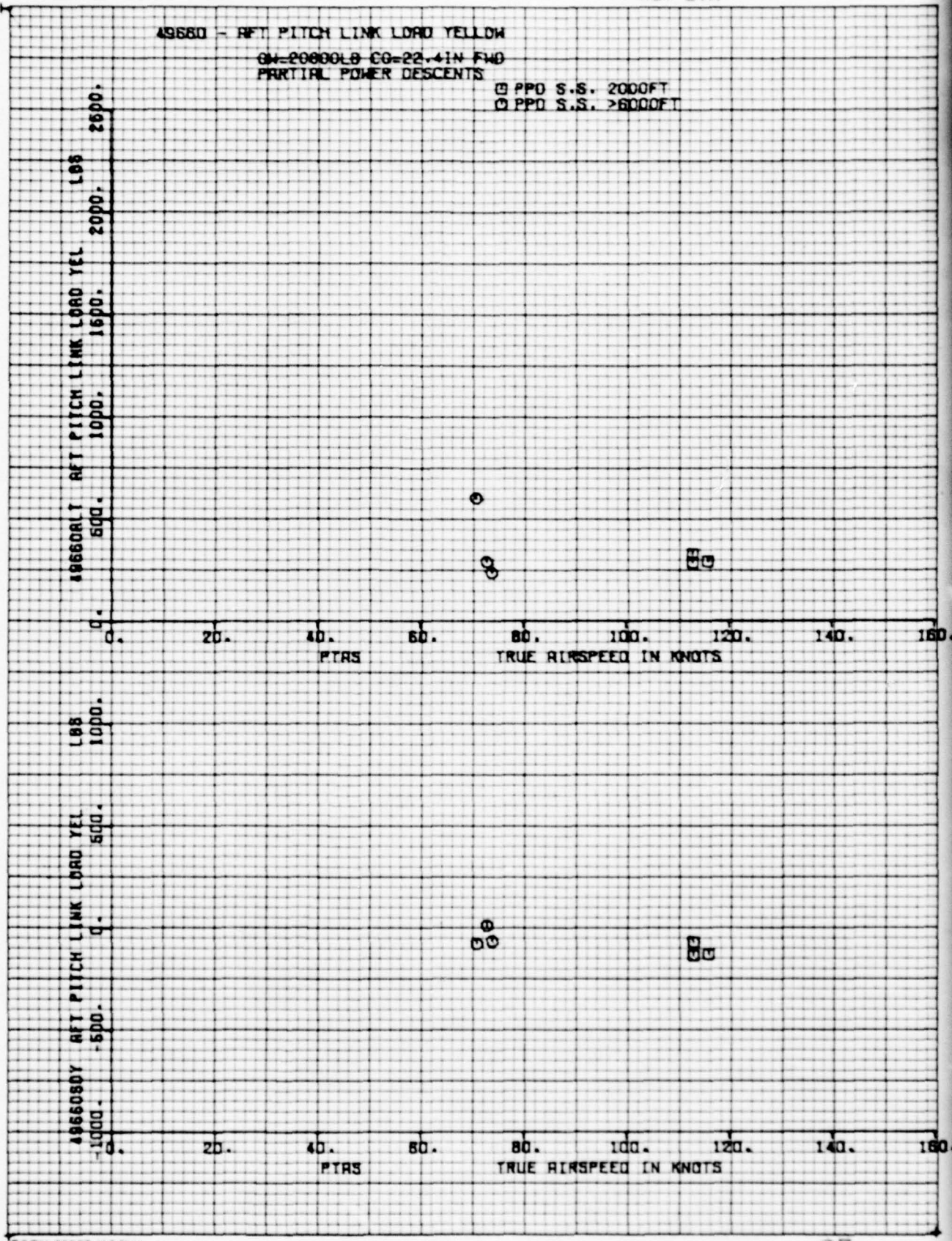
□ FLARE PWR ON



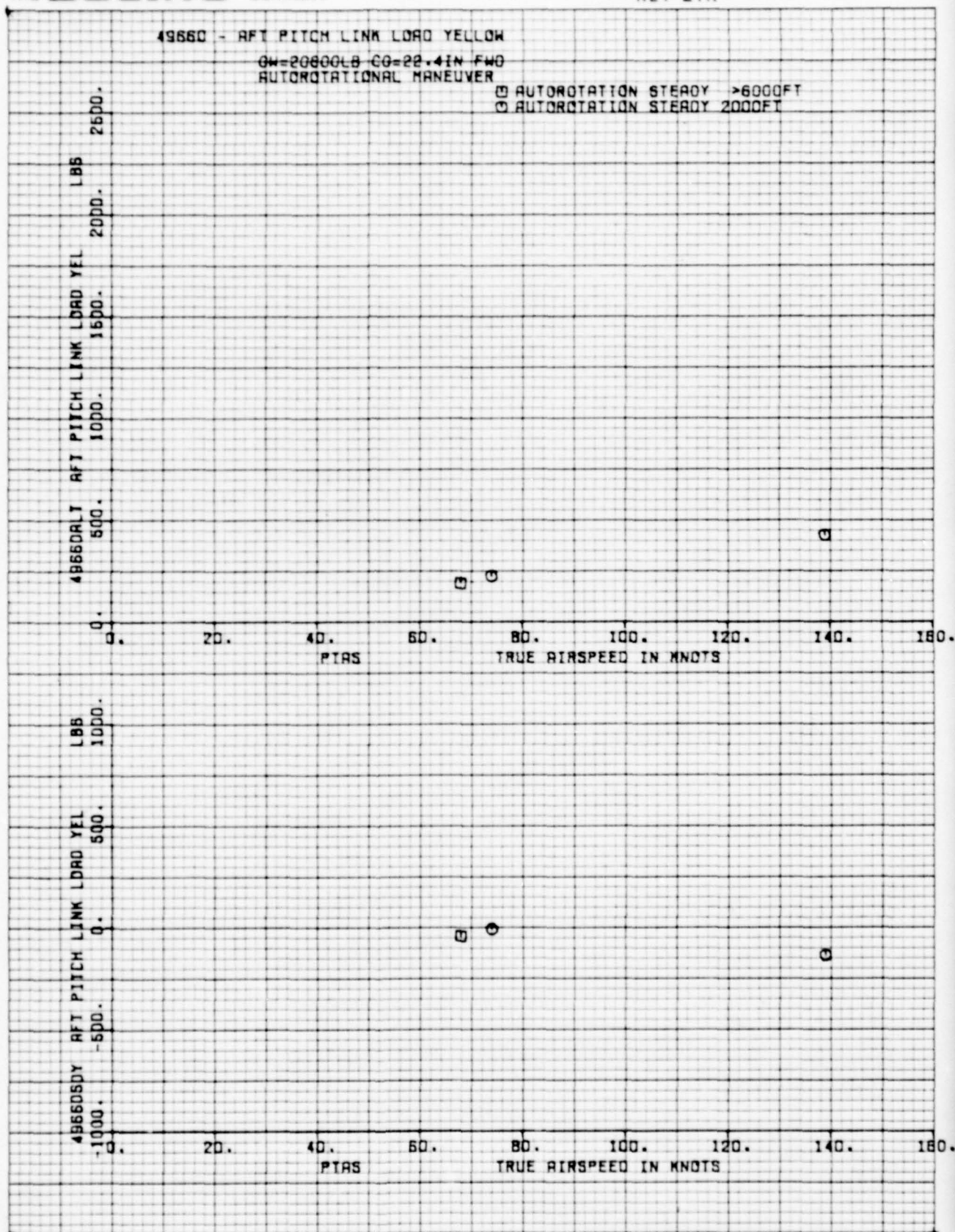
FORM 52300 (10/71)

THE **BOEING** COMPANY

FORM 52300 (10/71)

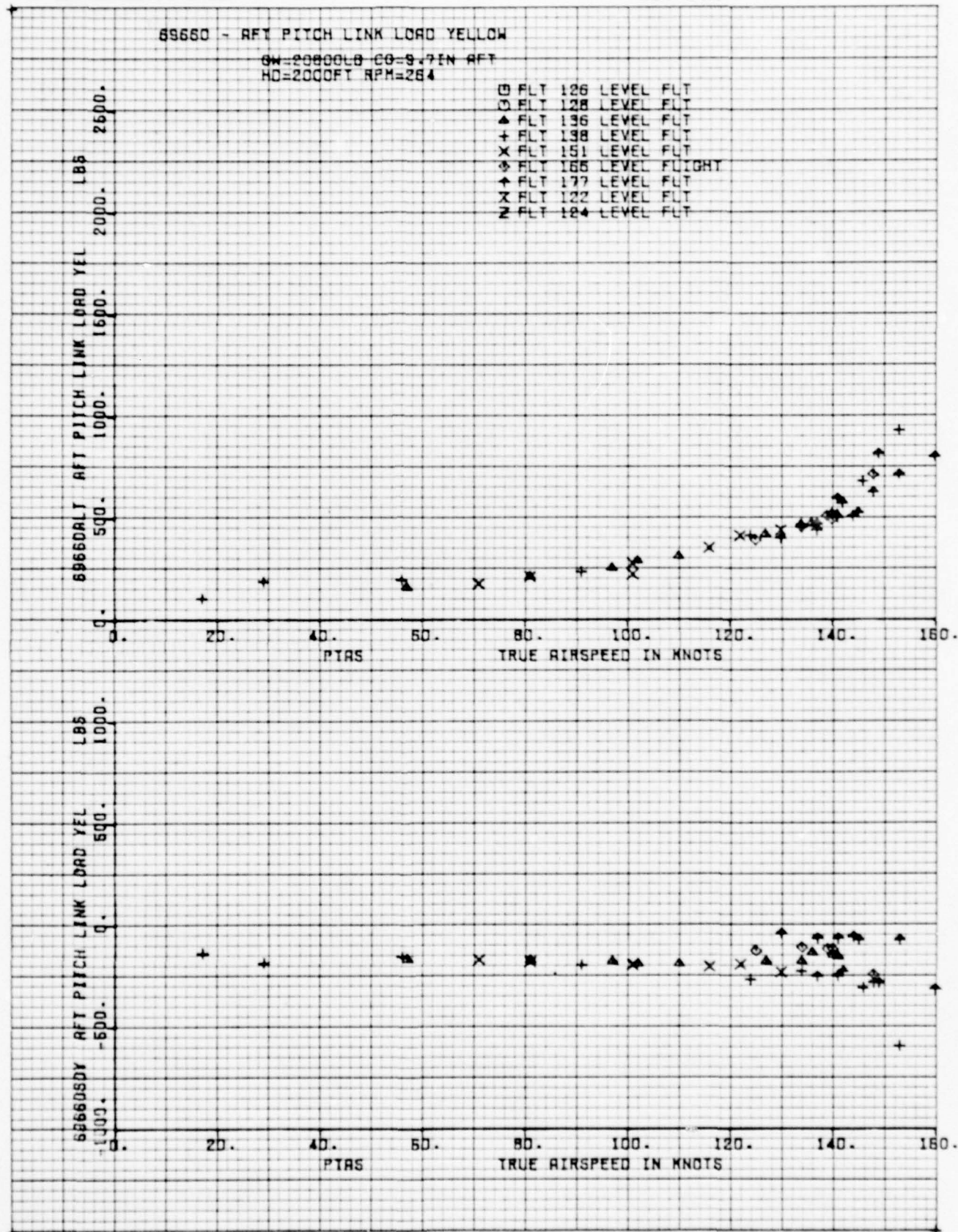


FORM 52300 (10/71)

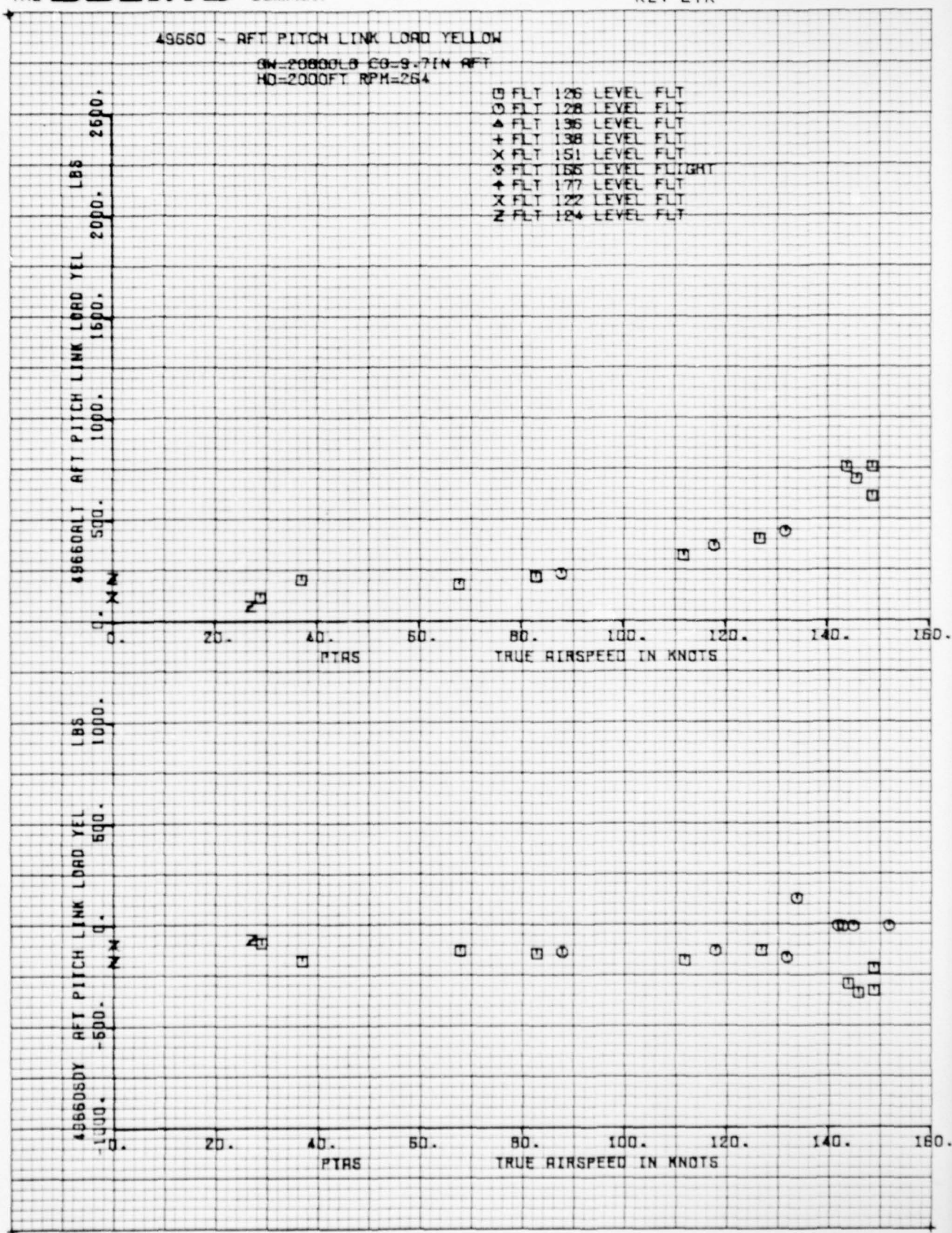


FORM 52300 (10/71)

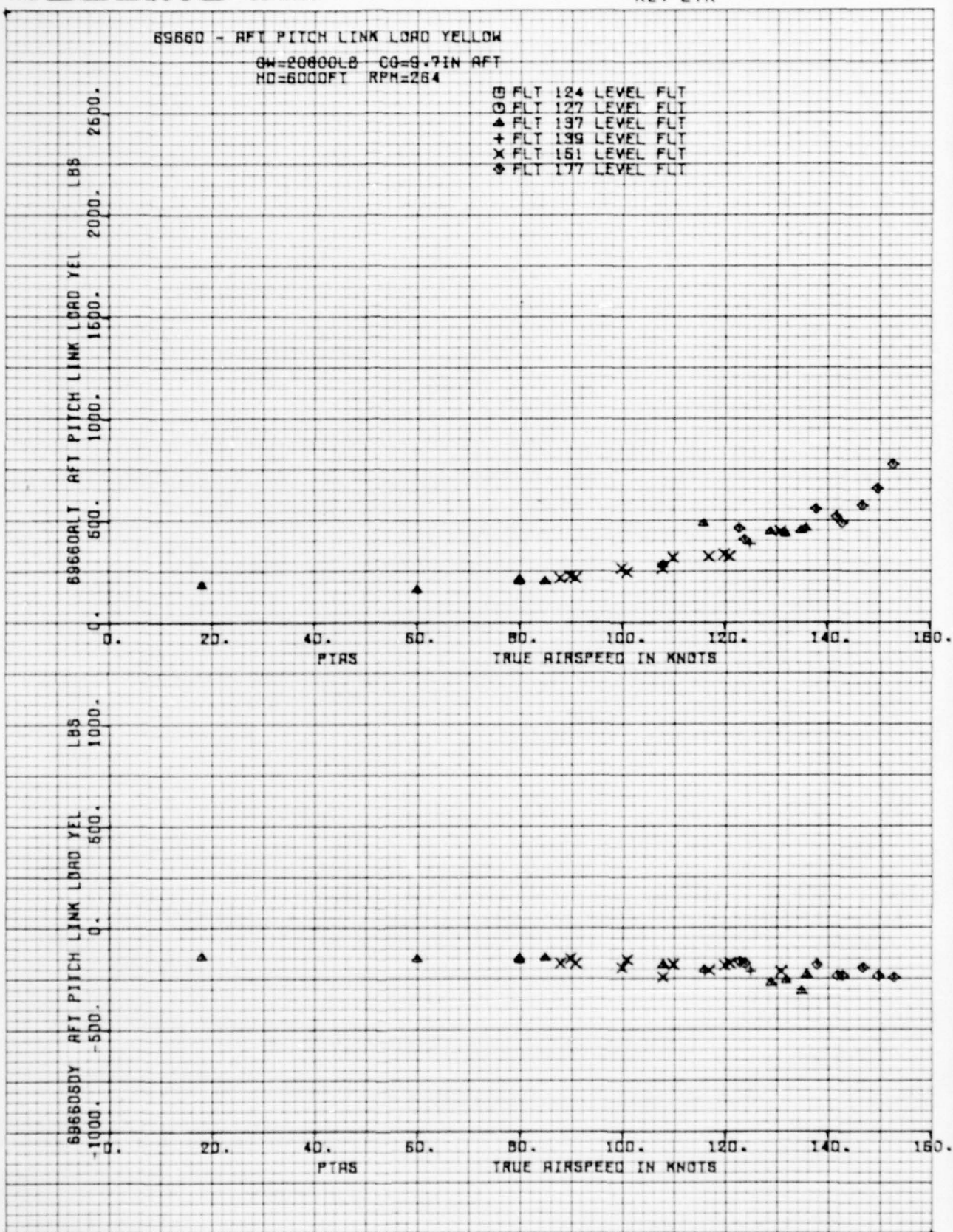
THE **BOEING** COMPANY



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THE **BOEING** COMPANY

49660 - AFT PITCH LINK LOAD YELLOW

GW=20800LB CG=6.7IN AFT
MO=8000FT RPM=264

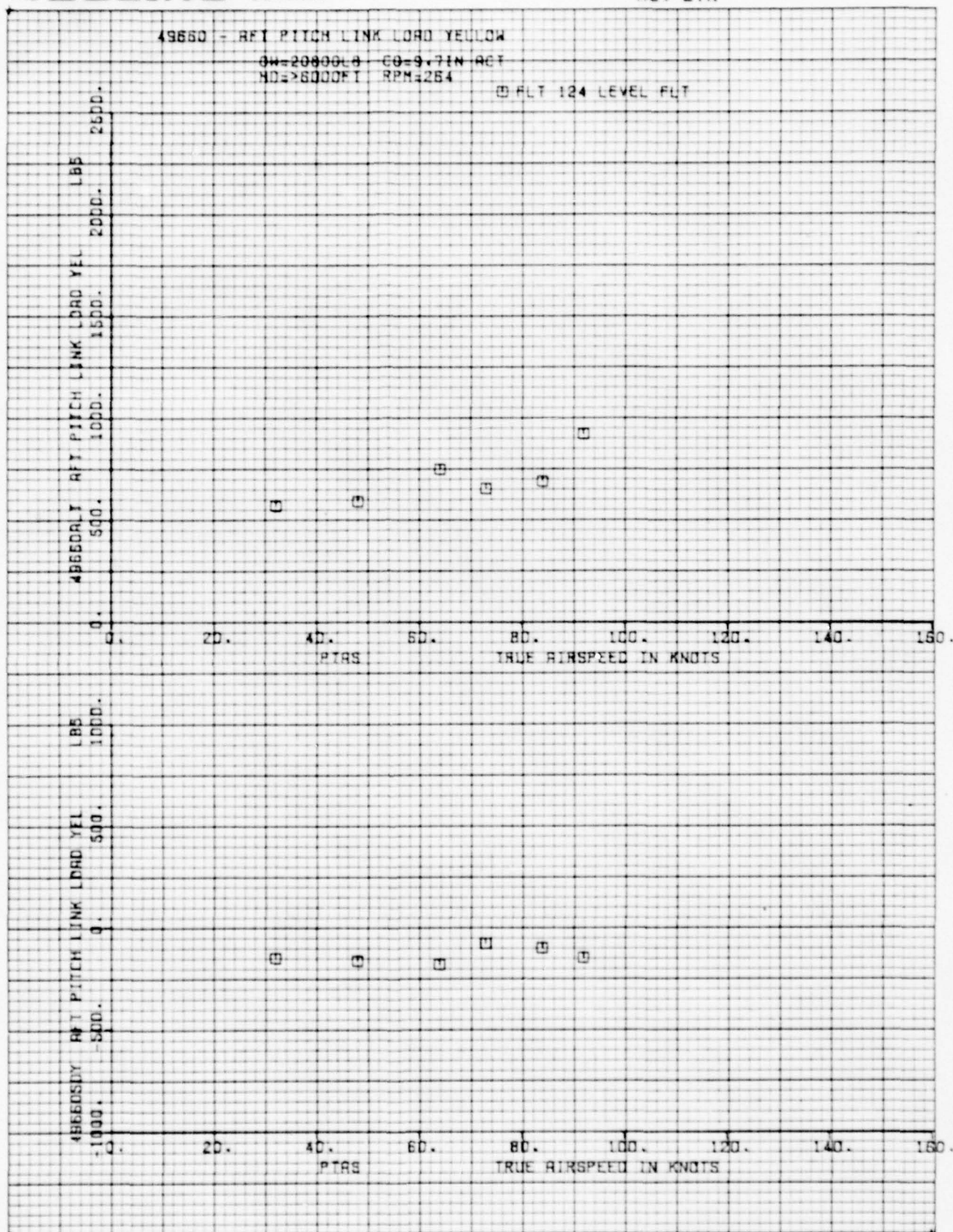
□ FLT 124 LEVEL FLT
 ○ FLT 127 LEVEL FLT
 ▲ FLT 137 LEVEL FLT
 + FLT 139 LEVEL FLT
 × FLT 181 LEVEL FLT
 ◆ FLT 177 LEVEL FLT

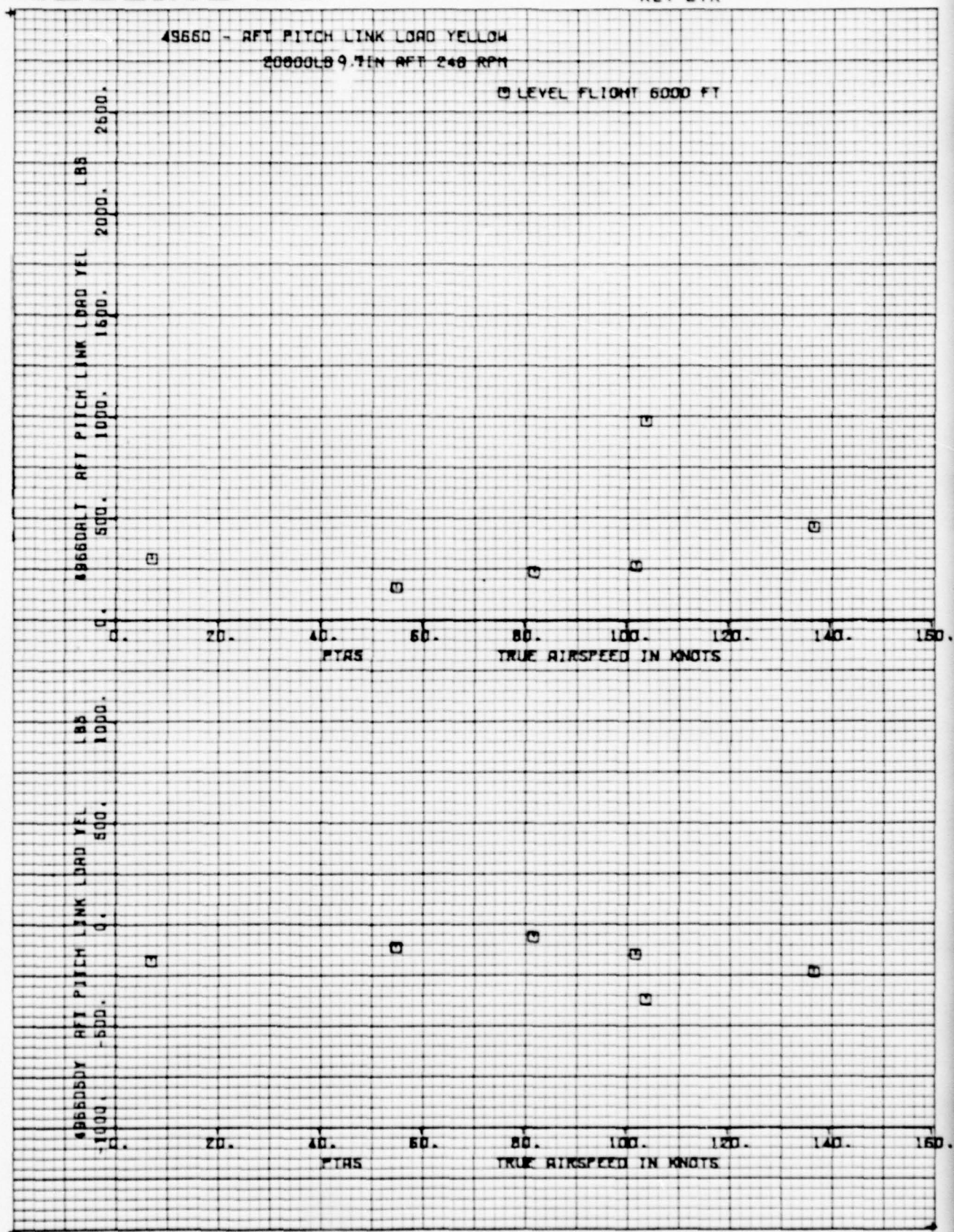
 49660ALY AFT PITCH LINK LOAD YEL LBS
 2600.
 2000.
 1500.
 1000.
 500.
 0.

 20. 40. 60. 80. 100. 120. 140. 160.
 PIAS TRUE AIRSPEED IN KNOTS

 49660SDY AFT PITCH LINK LOAD YEL LBS
 1000.
 500.
 0.
 -500.
 -1000.

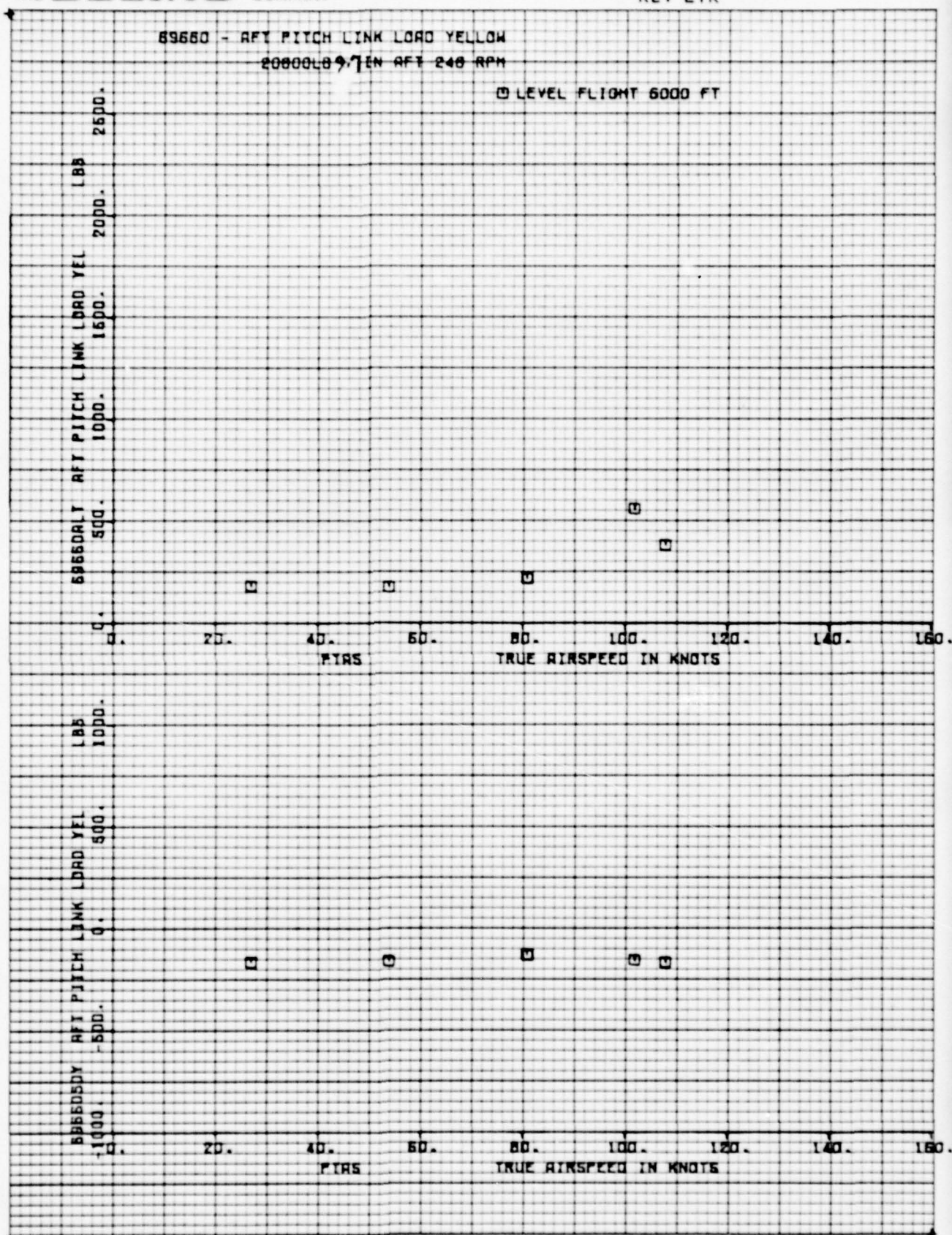
 20. 40. 60. 80. 100. 120. 140. 160.
 PIAS TRUE AIRSPEED IN KNOTS



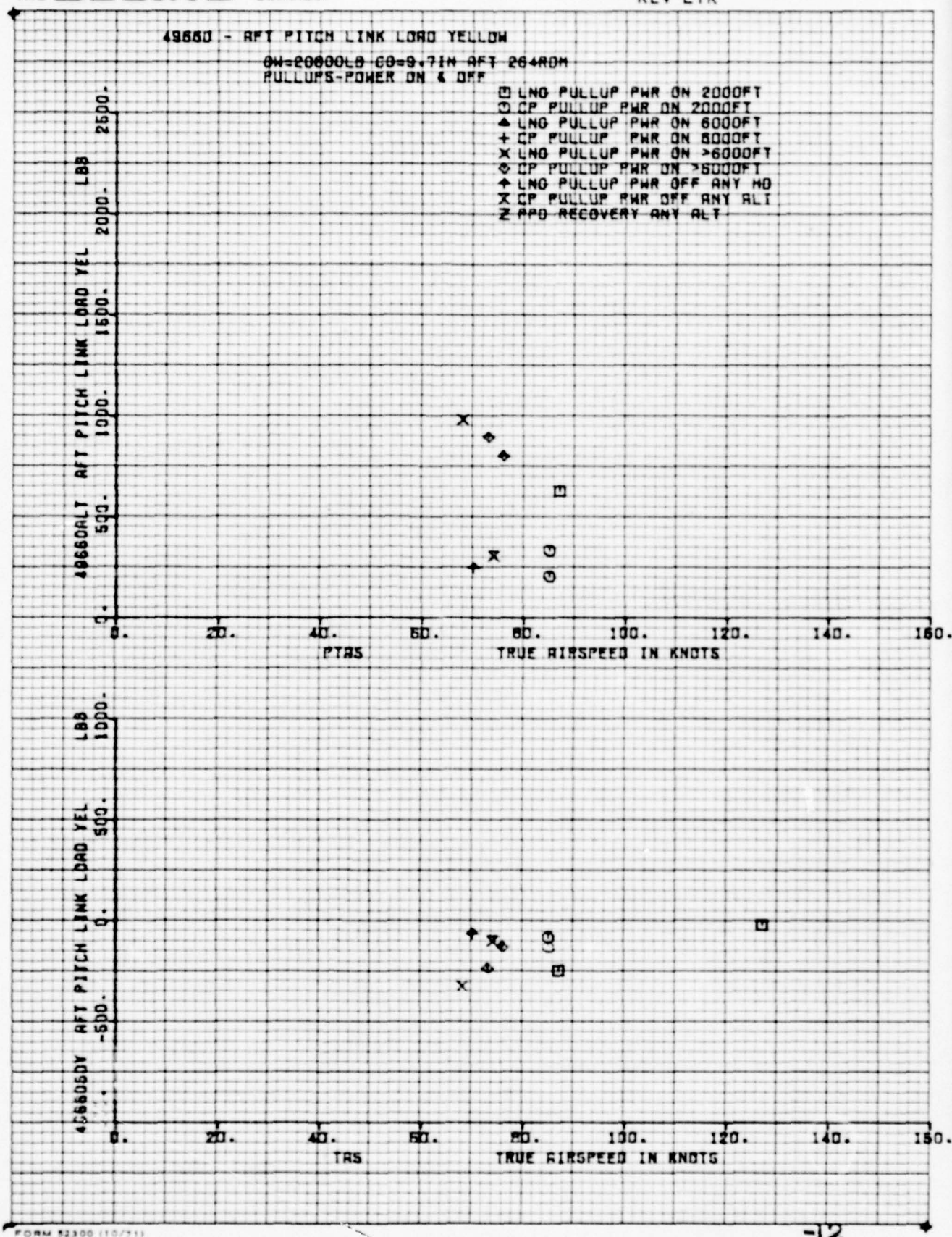
THE **BOEING** COMPANY

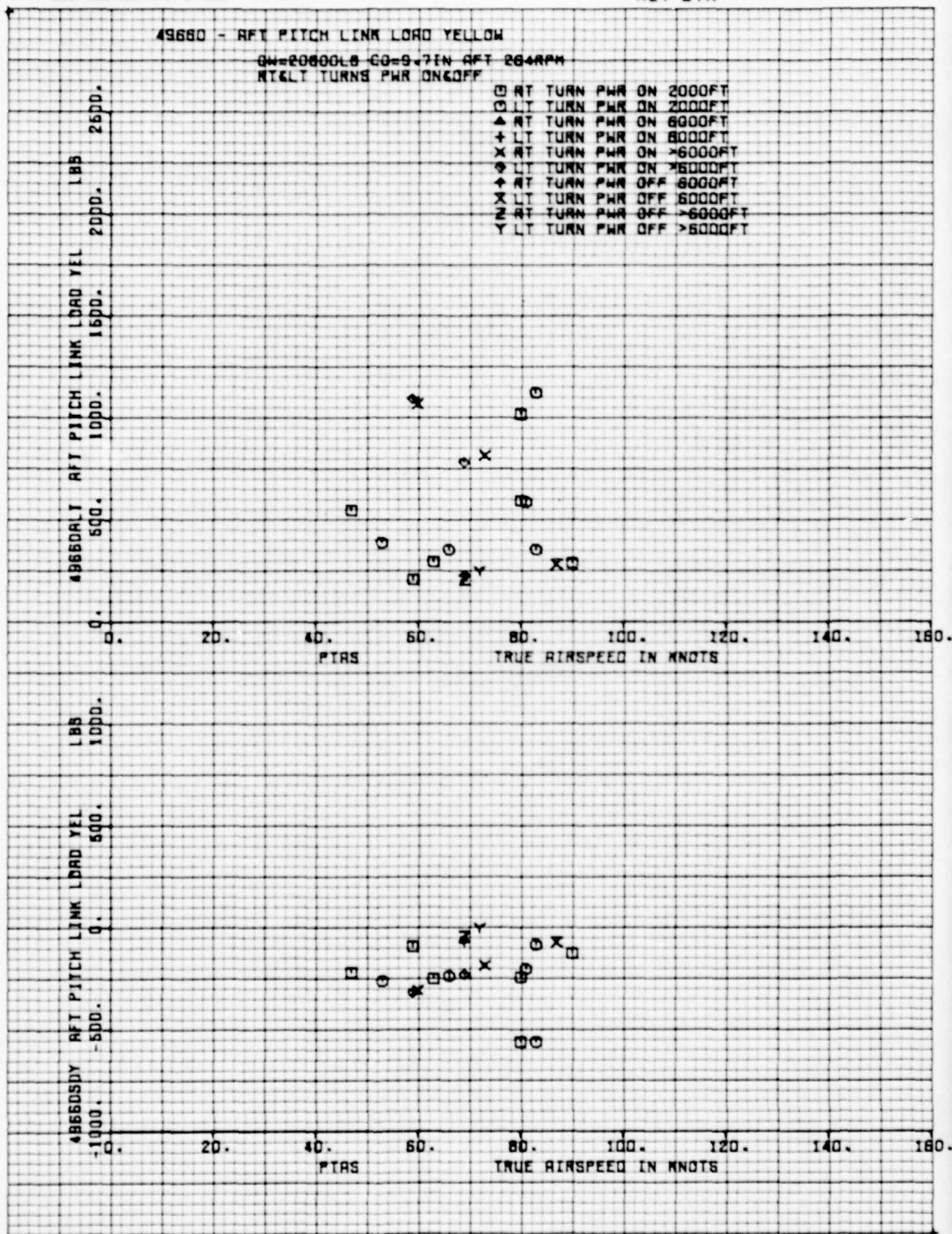
FORM 82300 (10/71)

THE **BOEING** COMPANY



FORM 82300 (10/71)

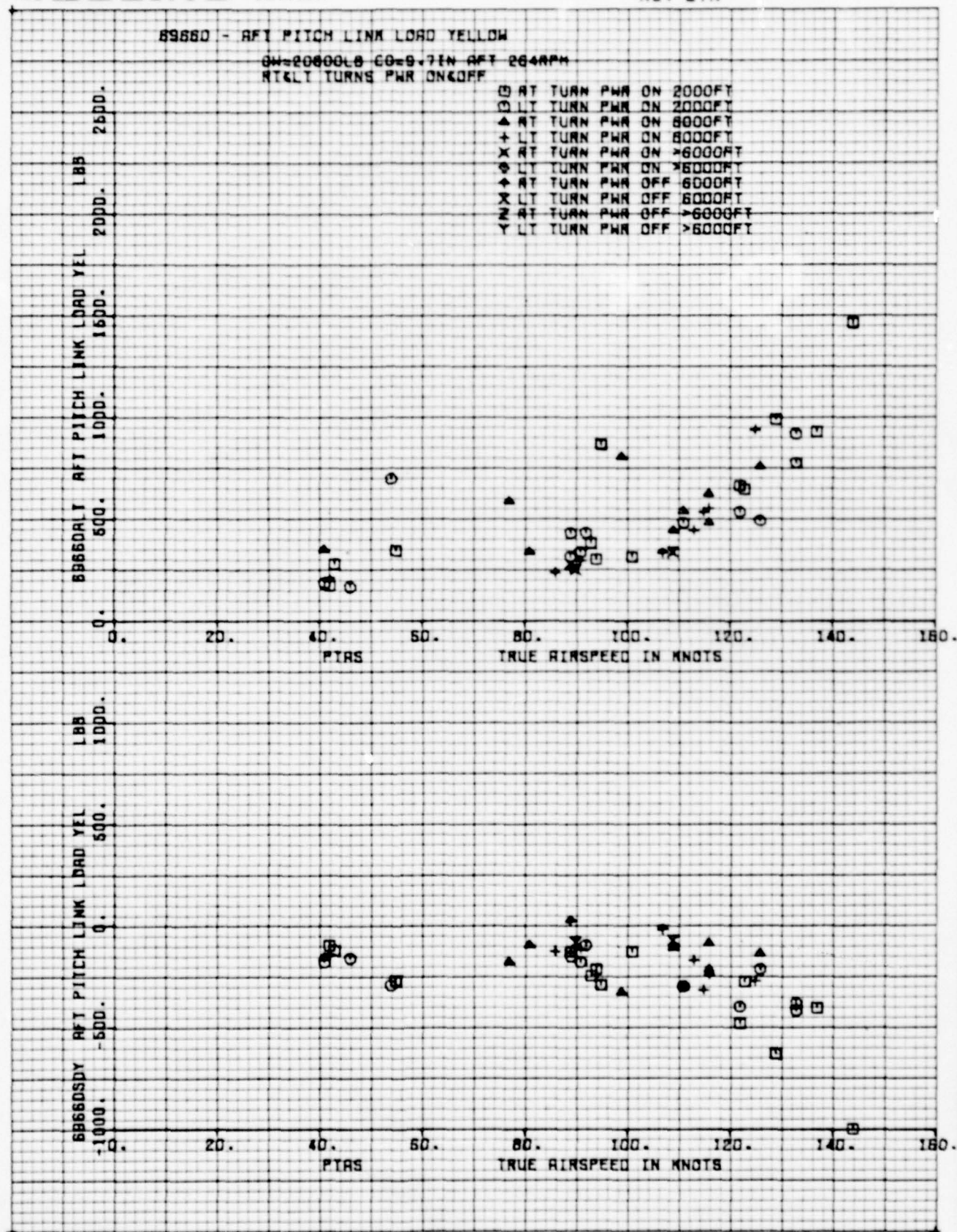




FORM 52300 (10/71)

THE **BOEING** COMPANYNUMBER
REV LTR

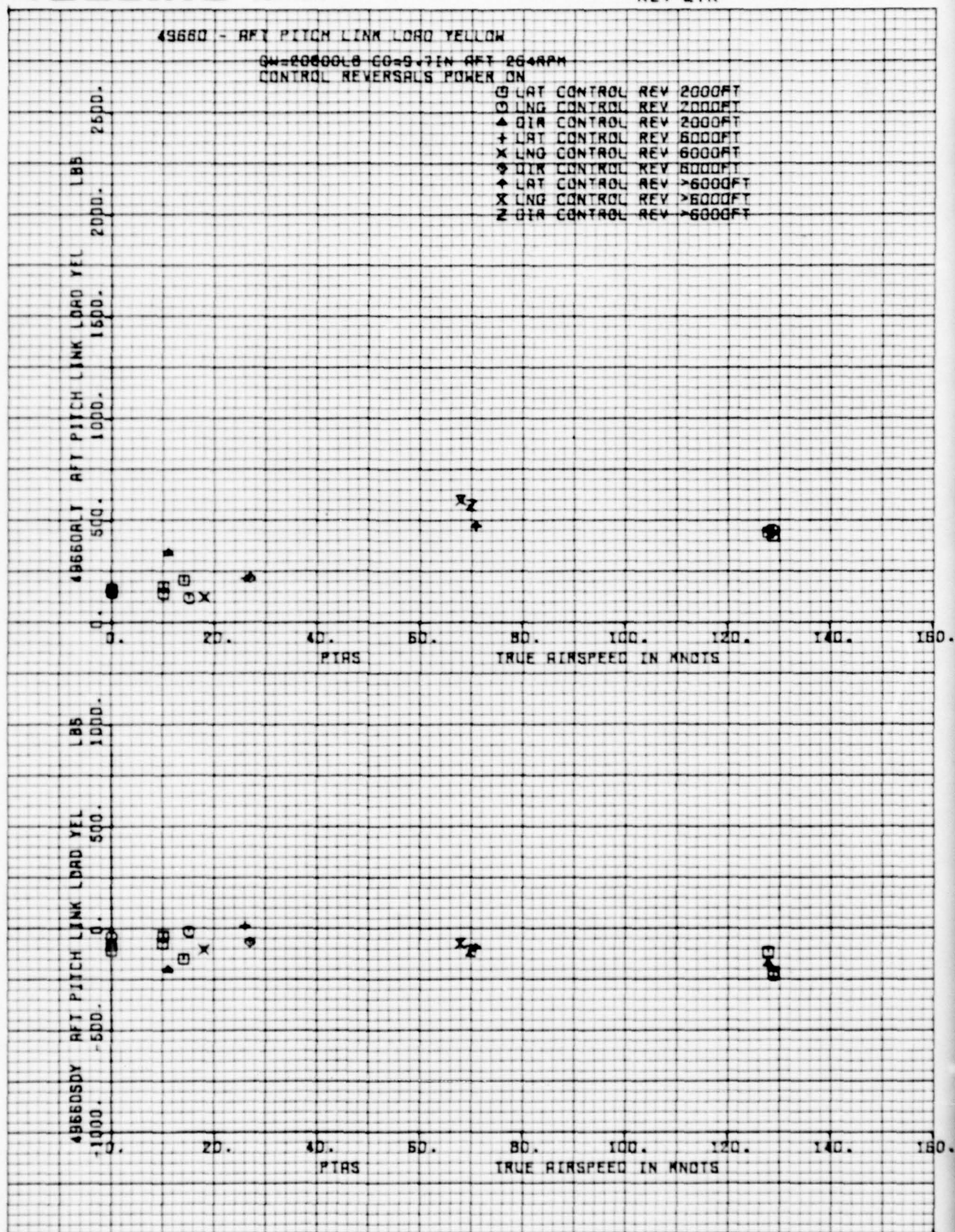
VOLUME 7

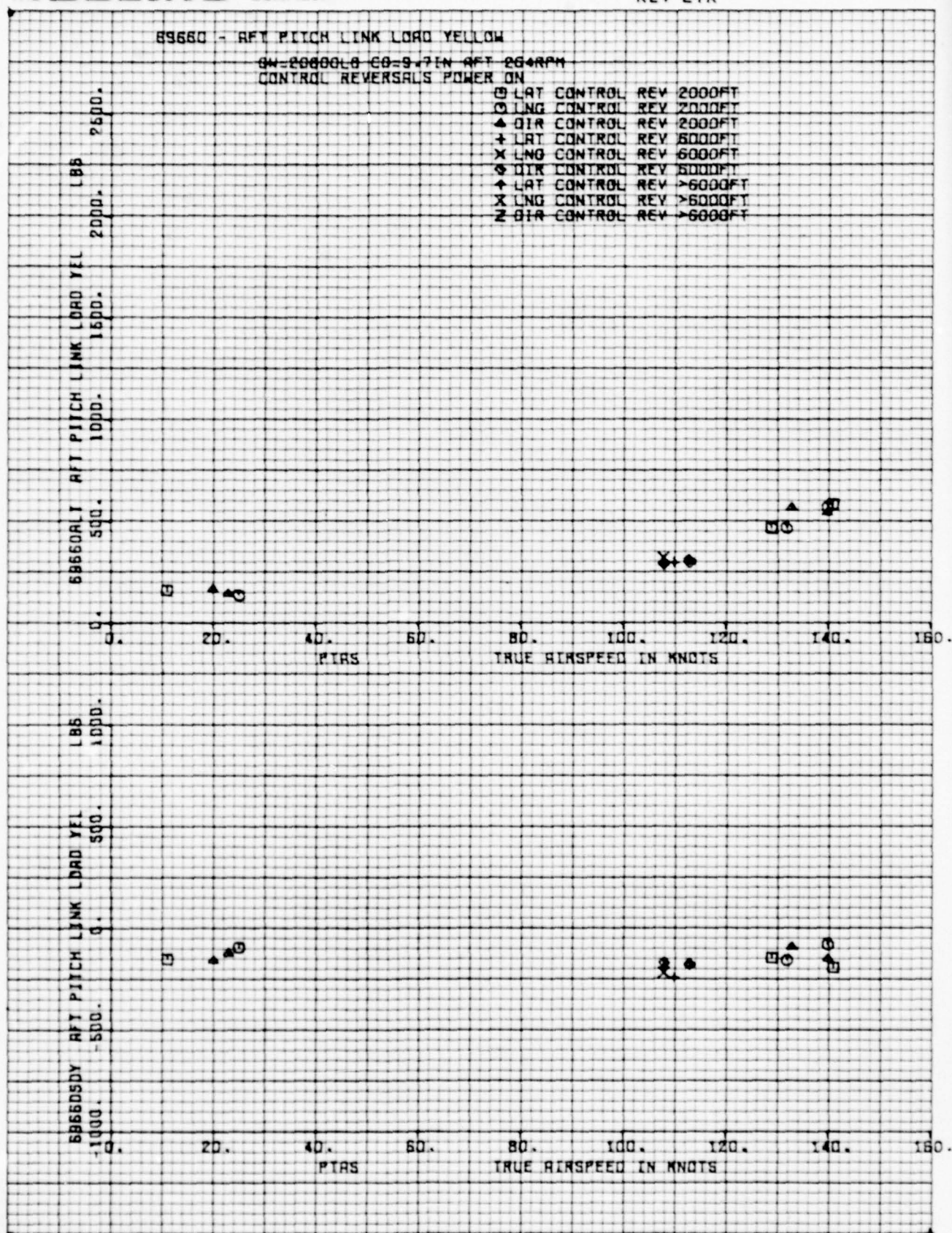


FORM 52300 (10/71)

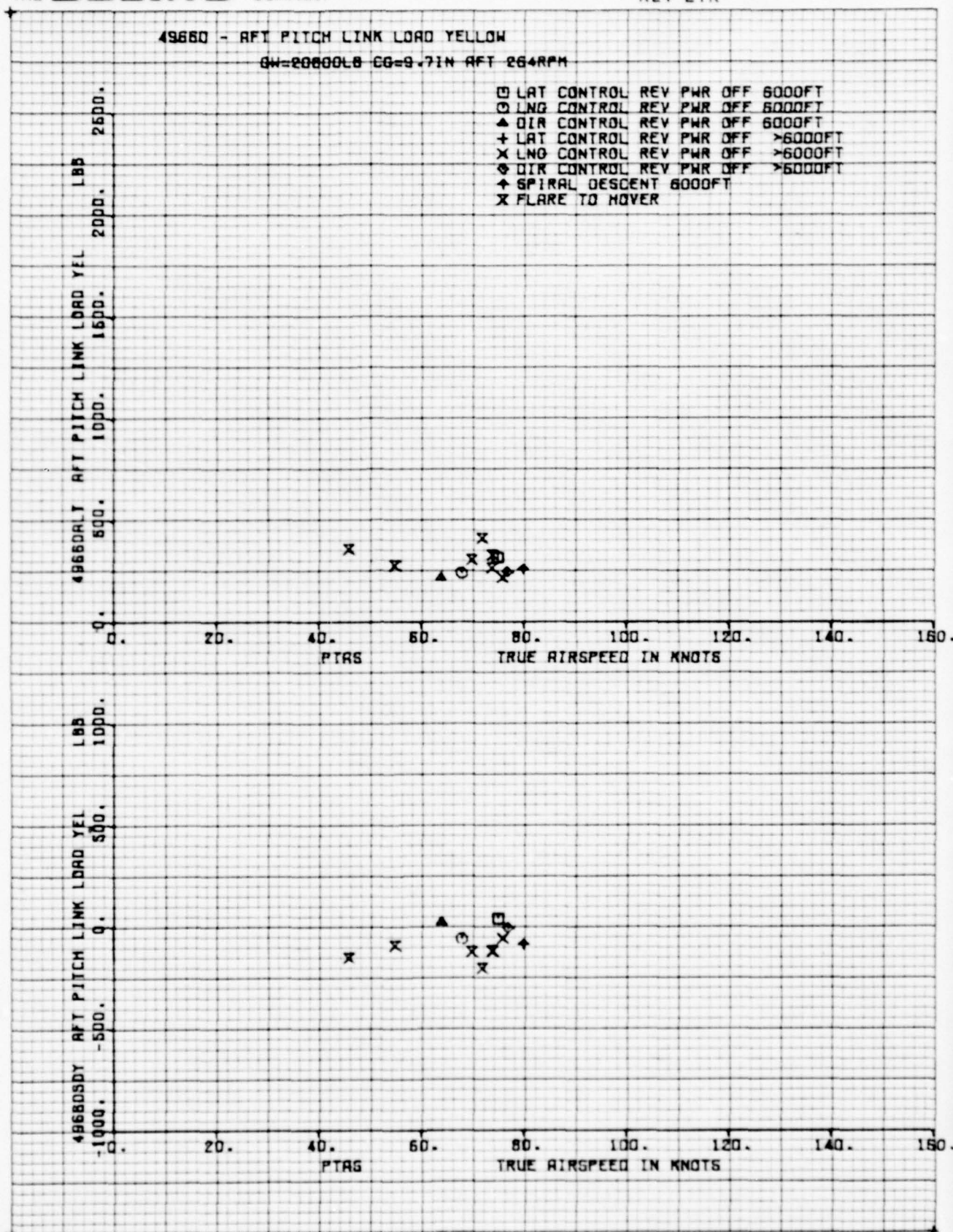
SHEET 75

-16



THE **BOEING** COMPANY

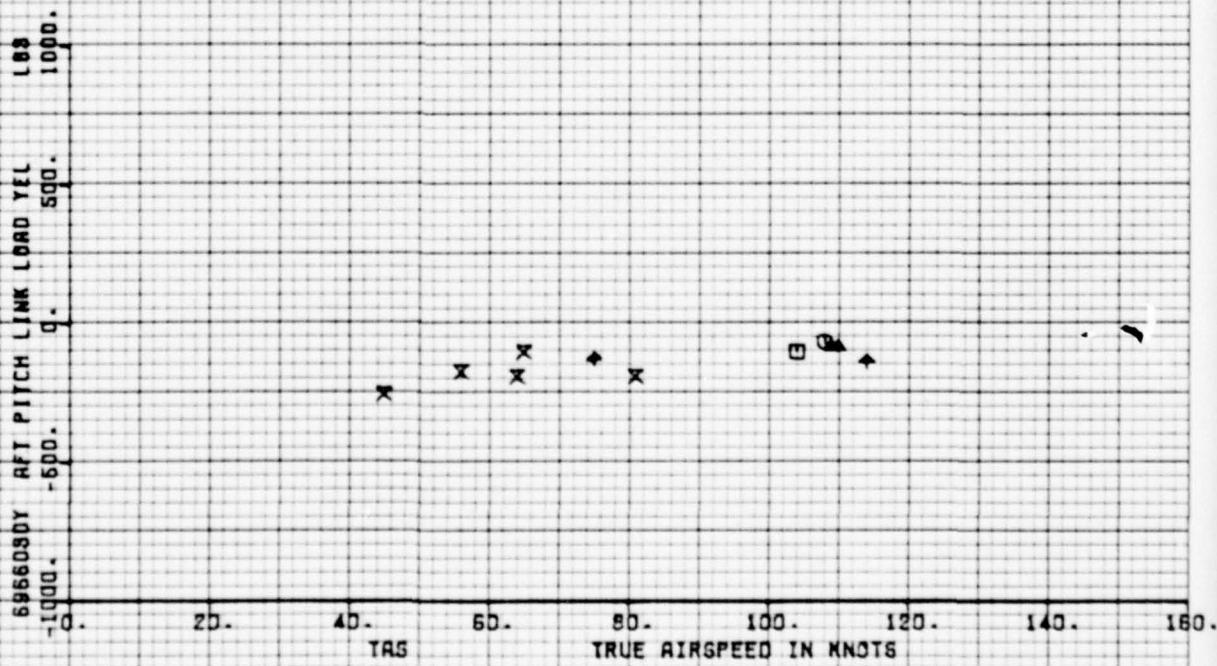
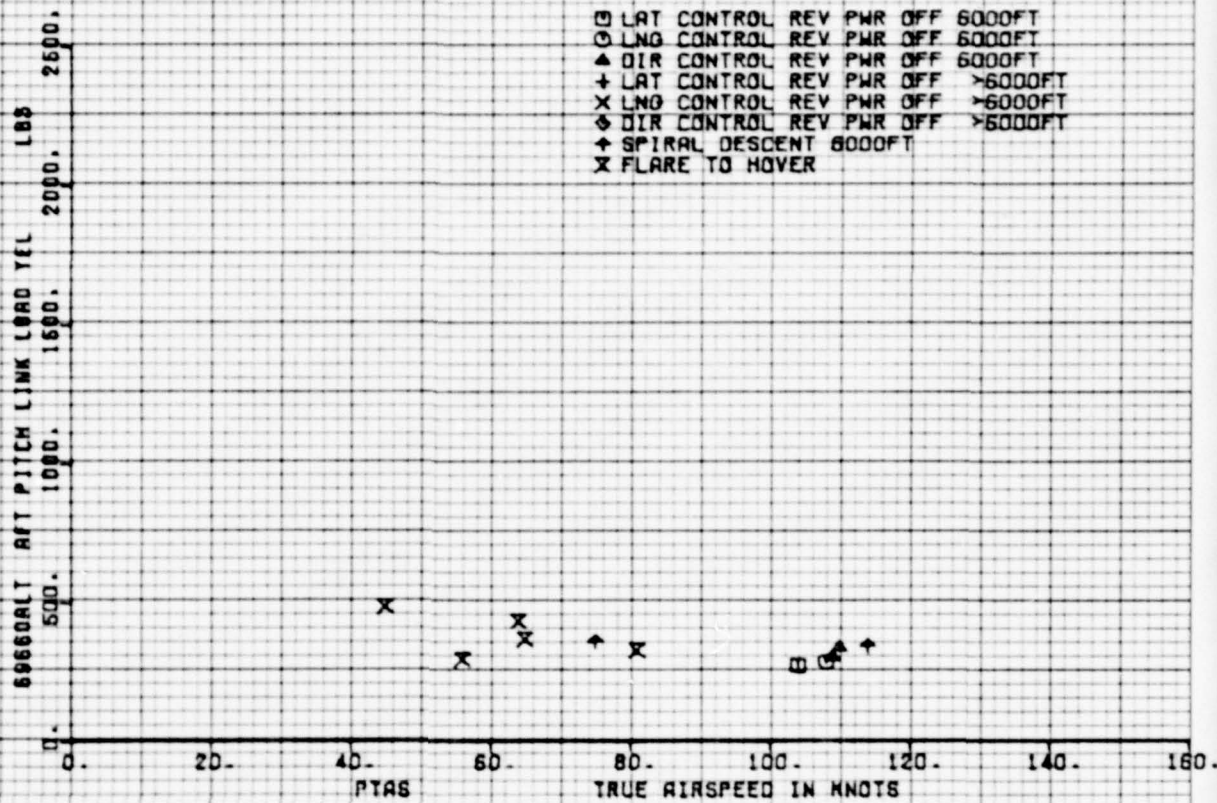
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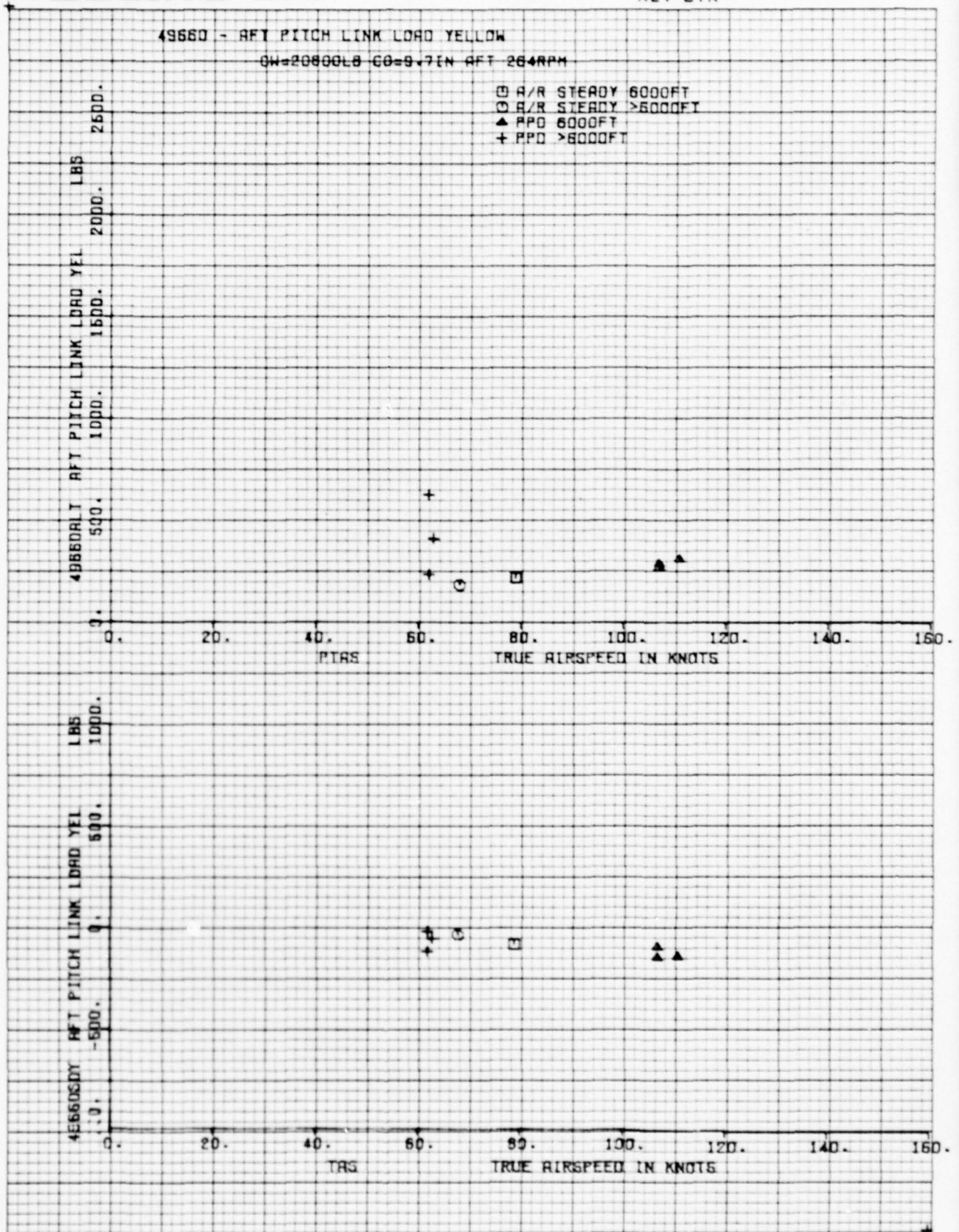


69660 - AFT PITCH LINK LOAD YELLOW

GW=20800LB CO=9.7IN AFT 284RPM

- LAT CONTROL REV PWR OFF 6000FT
- LNG CONTROL REV PWR OFF 6000FT
- ▲ DIR CONTROL REV PWR OFF 6000FT
- + LAT CONTROL REV PWR OFF >6000FT
- x LNG CONTROL REV PWR OFF >6000FT
- ◇ DIR CONTROL REV PWR OFF >6000FT
- ↑ SPIRAL DESCENT 6000FT
- x FLARE TO HOVER



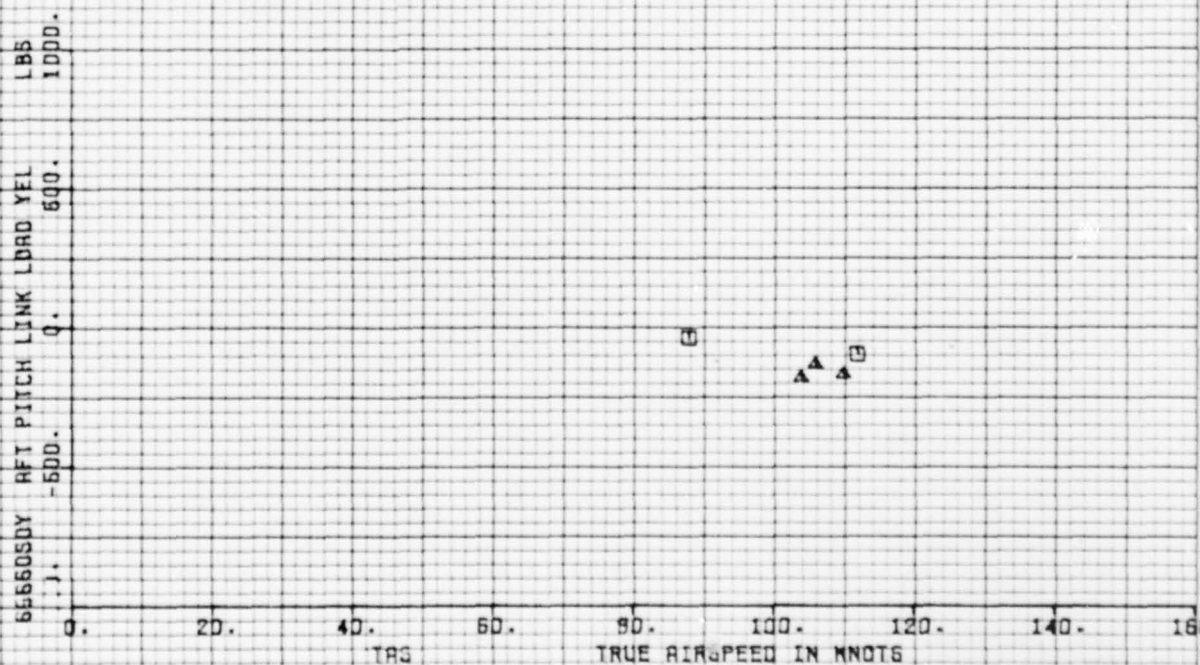
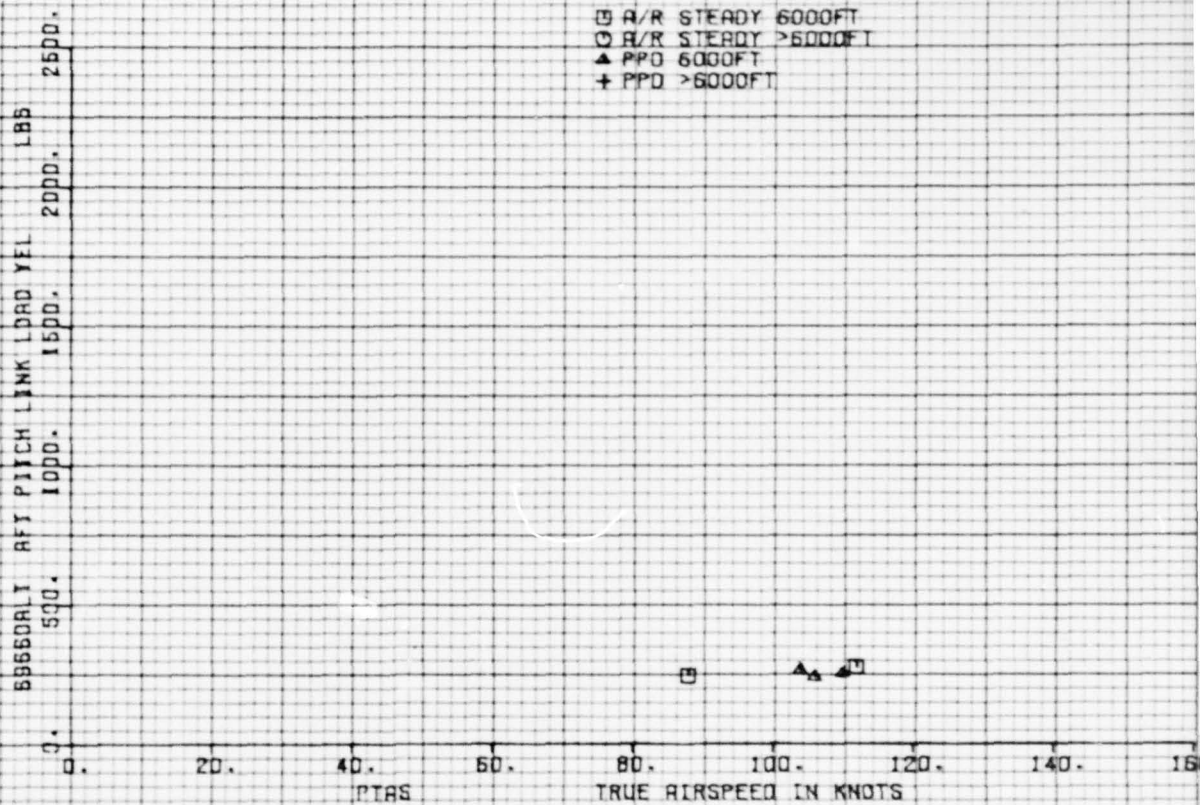


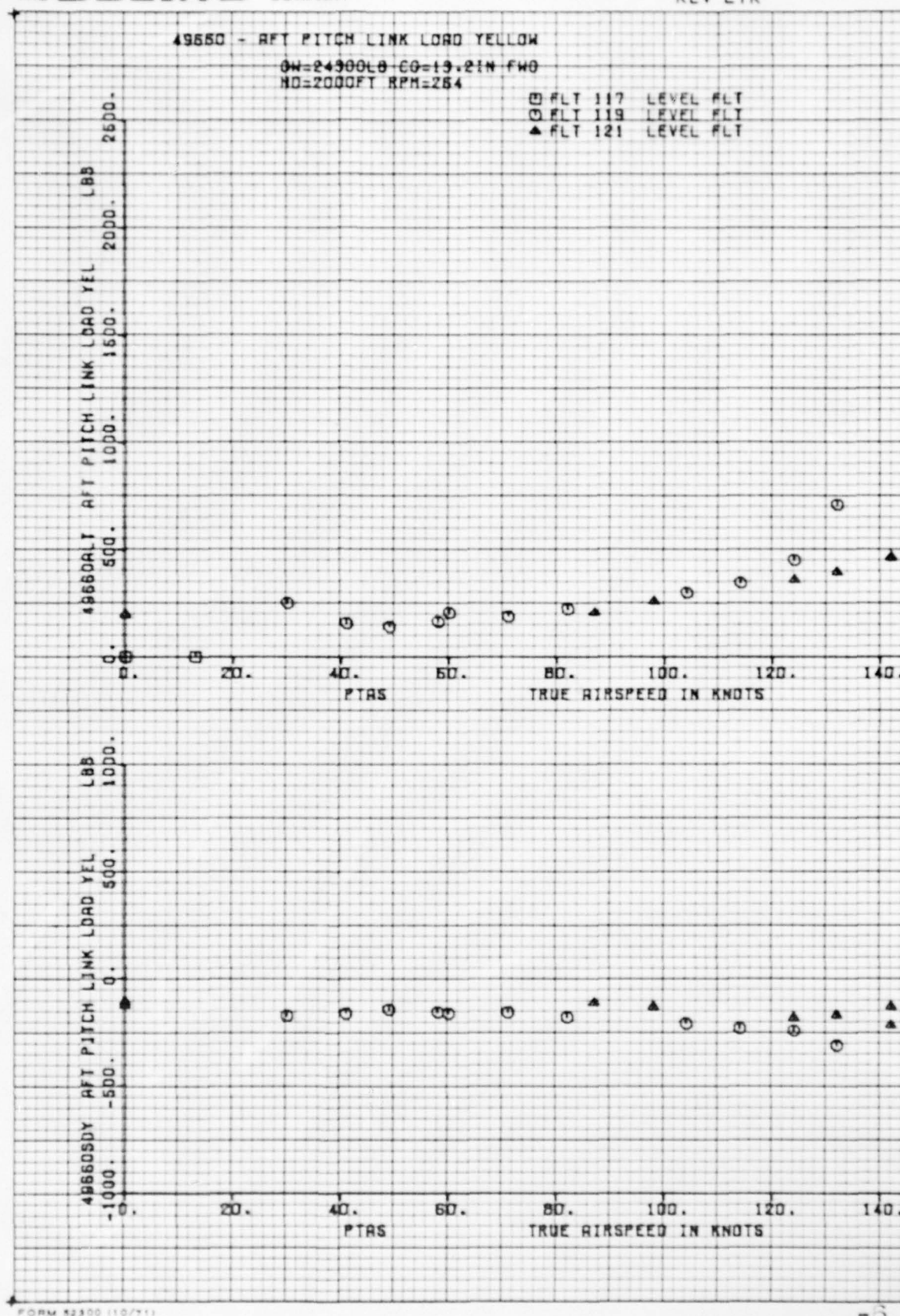
THE **BOEING** COMPANY

69660 - AFT PITCH LINK LOAD YELLOW

GW=20800LB CG=9.7IN AFT 264RPM

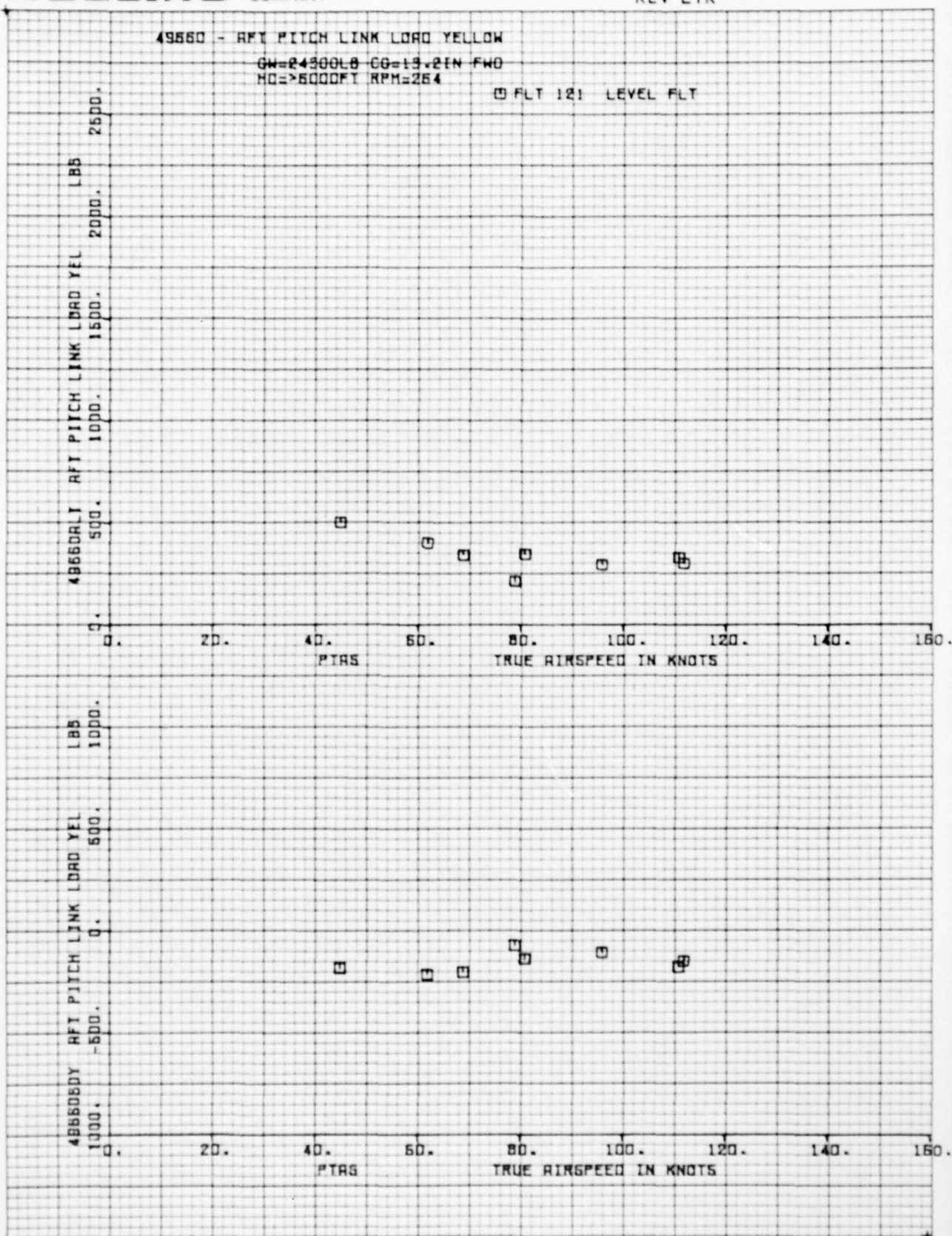
□ A/R STEADY 6000FT
 ○ A/R STEADY >6000FT
 ▲ PPD 6000FT
 + PPD >6000FT





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VOLUME 7



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THE **BOEING** COMPANY

49680 - AFT PITCH LINK LOAD YELLOW

GW=24500LB CG=13.2IN FWD
POWER ON & OFF PULLUPS

- LONG PULLUP PWR ON 2000FT
- CP PULLUP PWR ON 2000FT
- ▲ LONG PULLUP PWR ON >6000FT
- + CP PULLUP PWR ON >6000FT
- x CP PULLUP PWR OFF 2000FT
- ◇ LONG PULLUP PWR OFF 2000FT
- ↑ LONG PULLUP PWR OFF >6000FT
- x CP PULLUP PWR OFF >6000FT

49680ALY AFT PITCH LINK LOAD YEL LBS
2500.
2000.
1500.
1000.
500.
0.

20.

40.

60.

80.

100.

120.

140.

160.

PTAS

TRUE AIRSPEED IN KNOTS

49680SDY AFT PITCH LINK LOAD YEL LBS
1000.
500.
0.
-500.
-1000.

20.

40.

60.

80.

100.

120.

140.

160.

PTAS

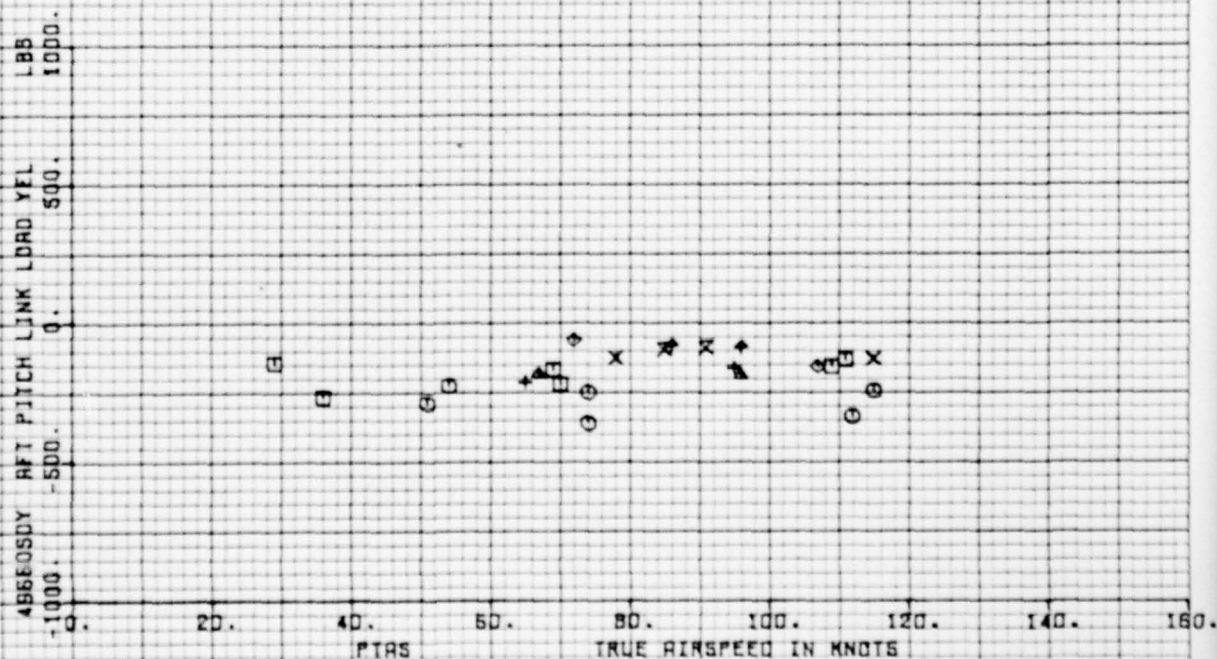
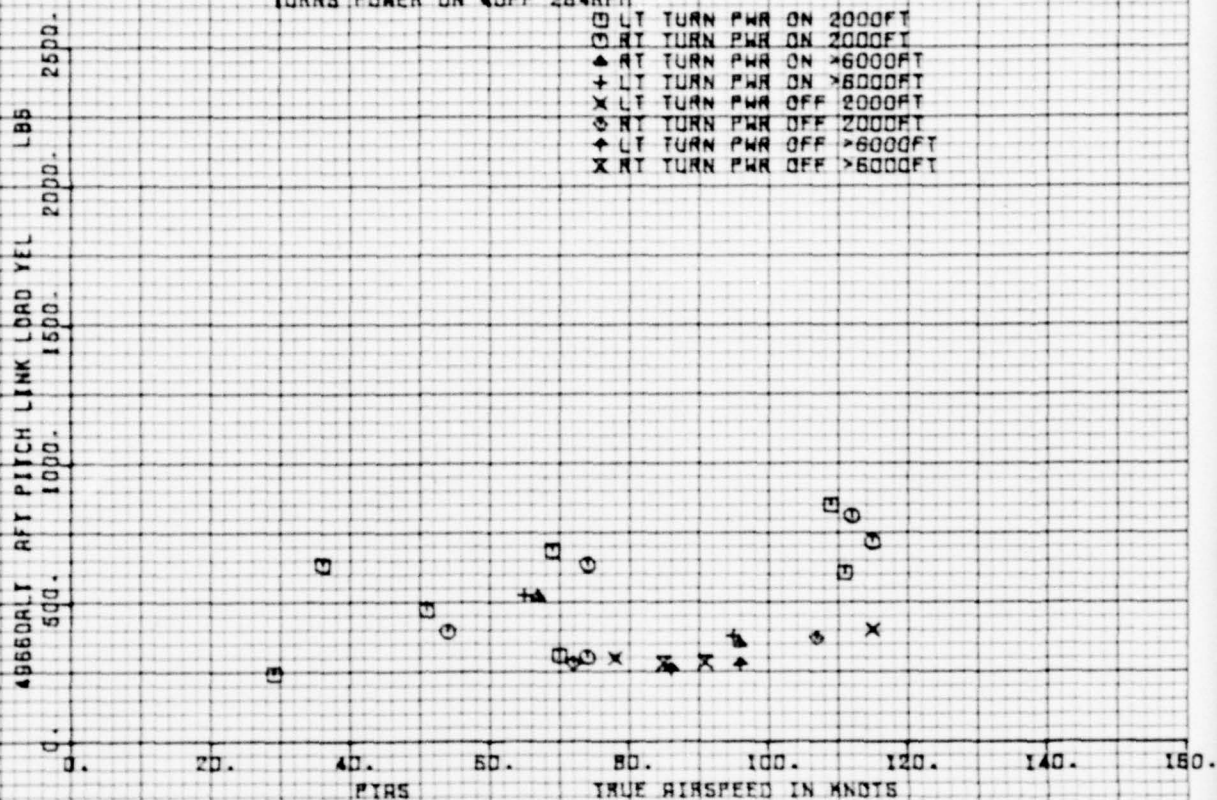
TRUE AIRSPEED IN KNOTS

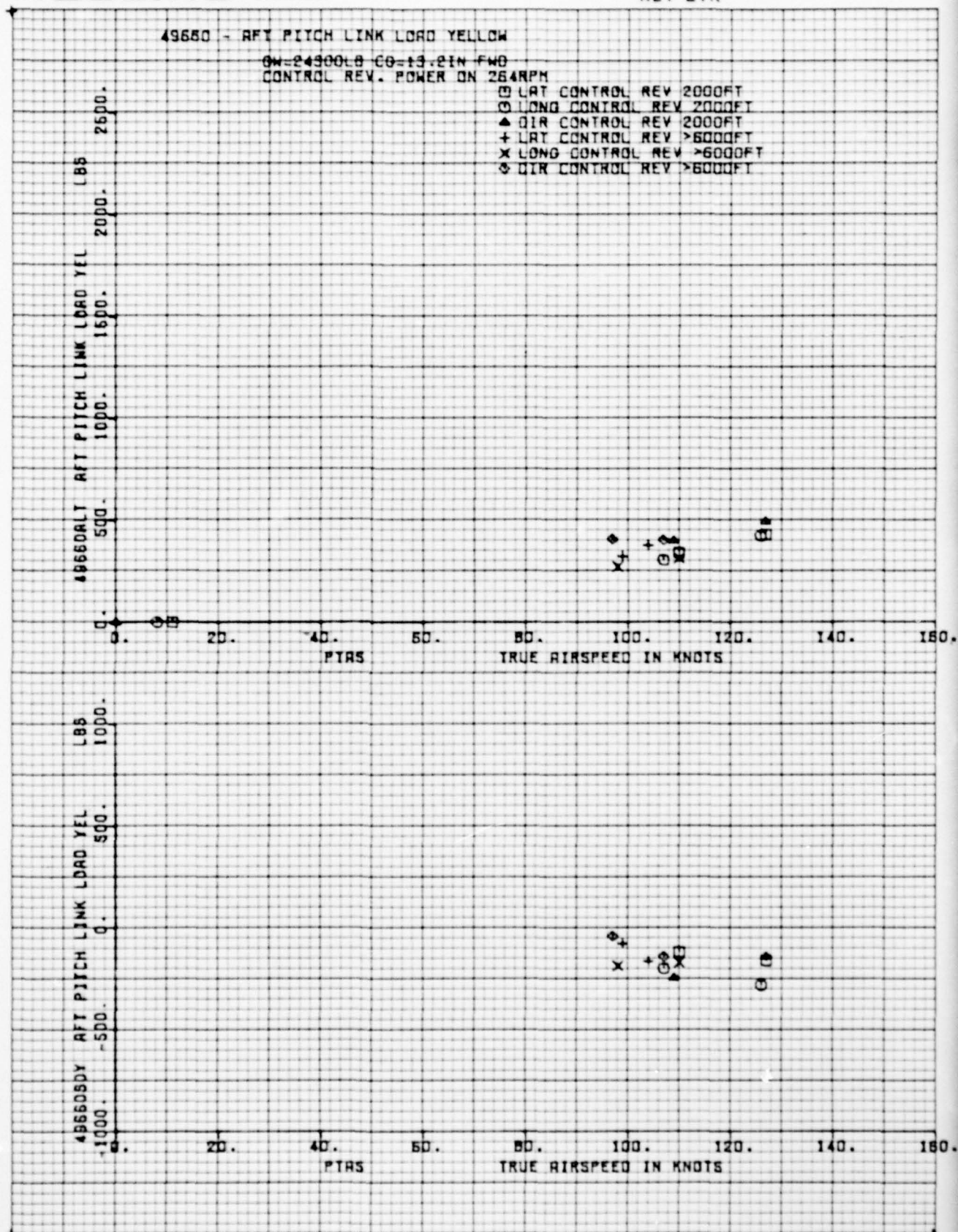
THE **BOEING** COMPANY

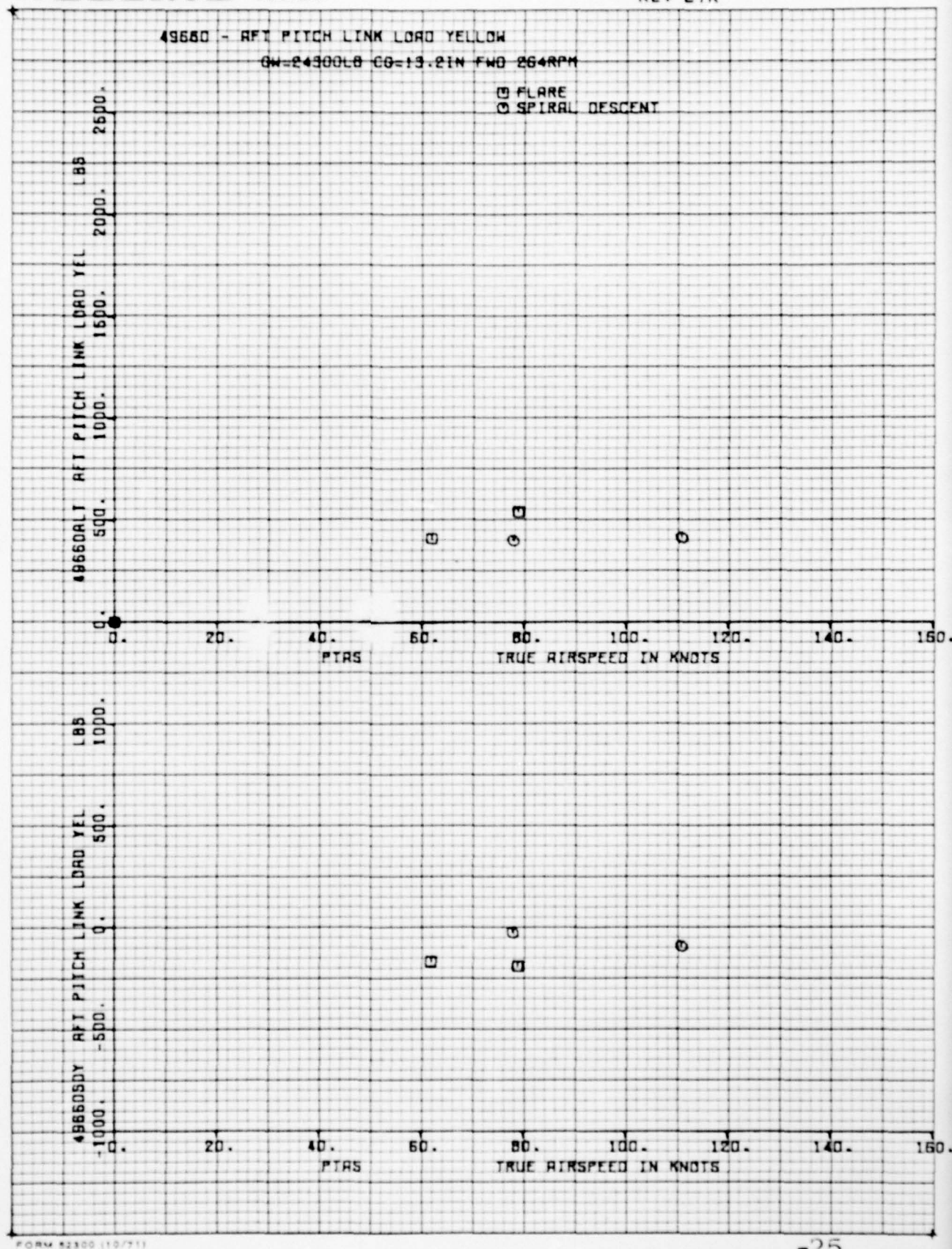
49650 - RFT PITCH LINK LOAD YELLOW

GW=24300LB CG=19.2IN FWD
TURNS POWER ON 40FF 264RPM

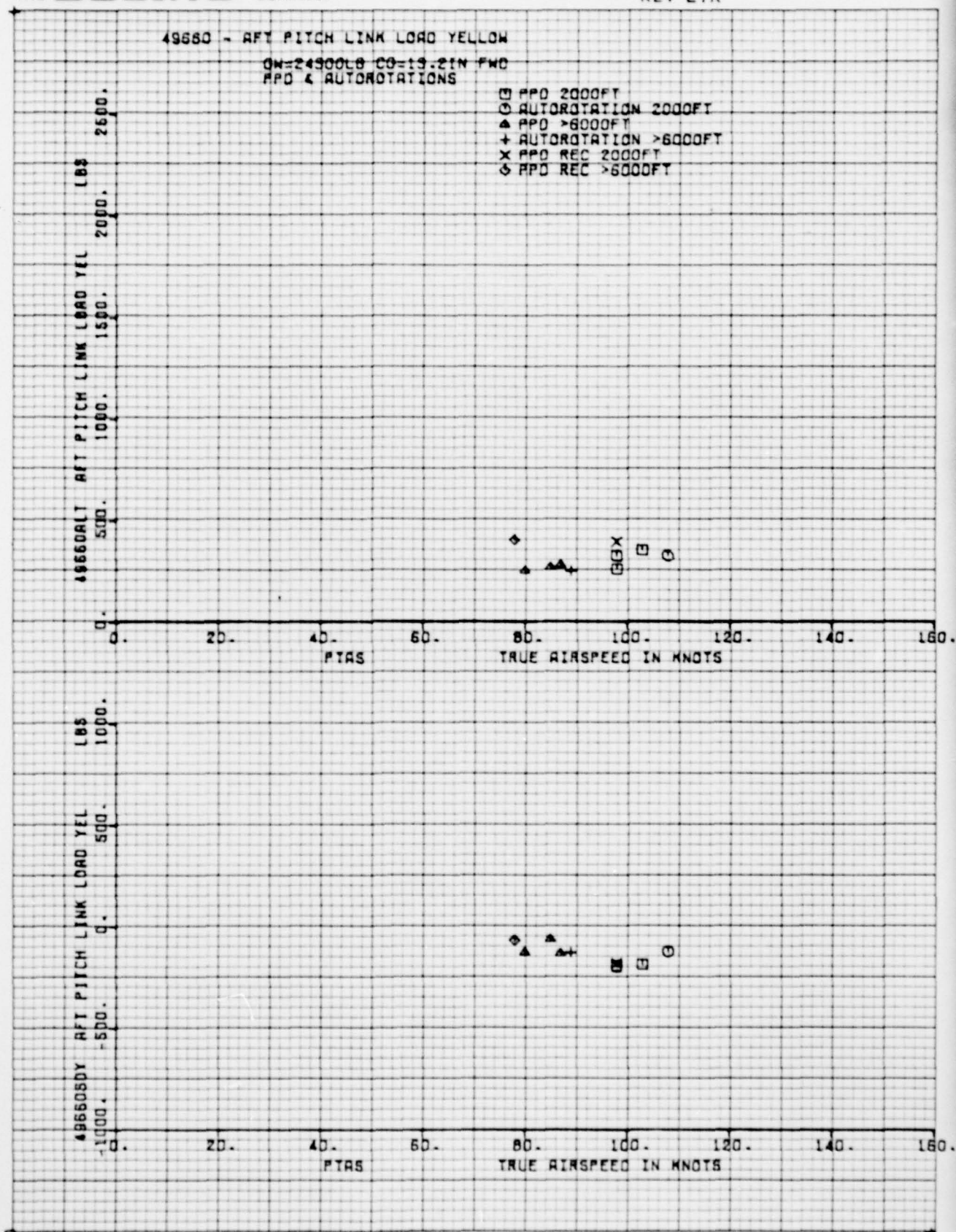
O LT TURN PWR ON 2000FT
 O RT TURN PWR ON 2000FT
 + RT TURN PWR ON >6000FT
 + LT TURN PWR ON >6000FT
 X LT TURN PWR OFF 2000FT
 O RT TURN PWR OFF 2000FT
 + LT TURN PWR OFF >6000FT
 X RT TURN PWR OFF >6000FT

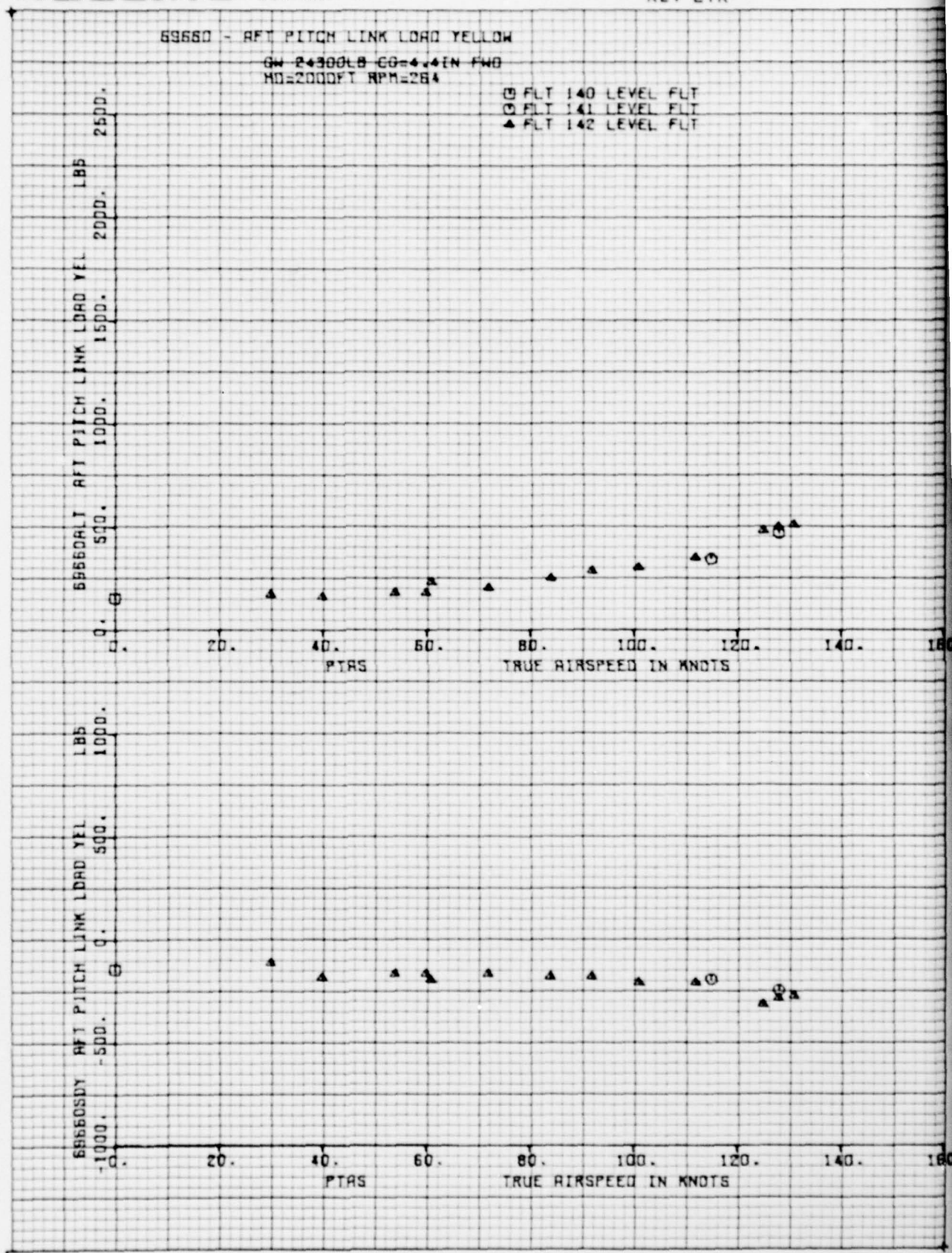




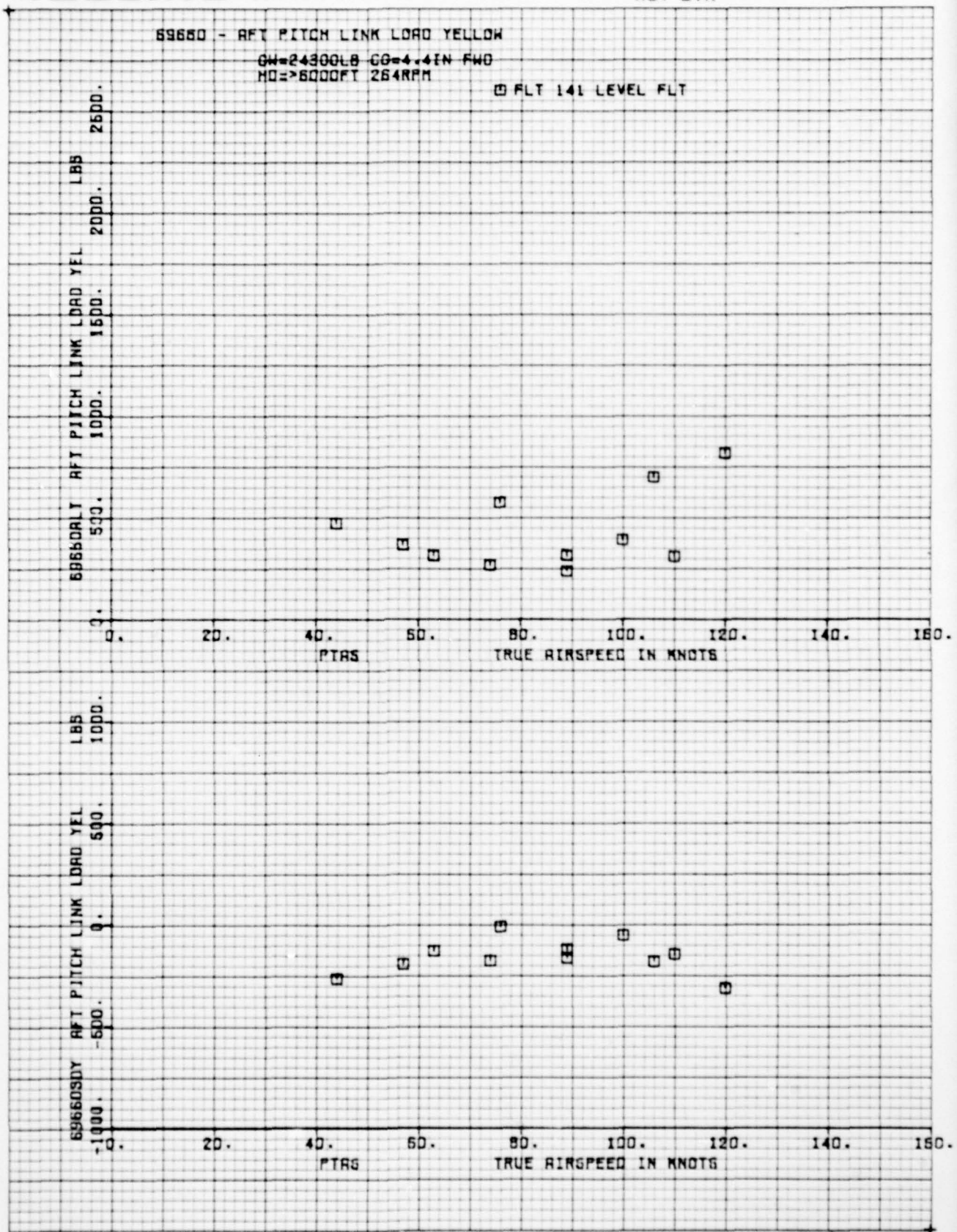


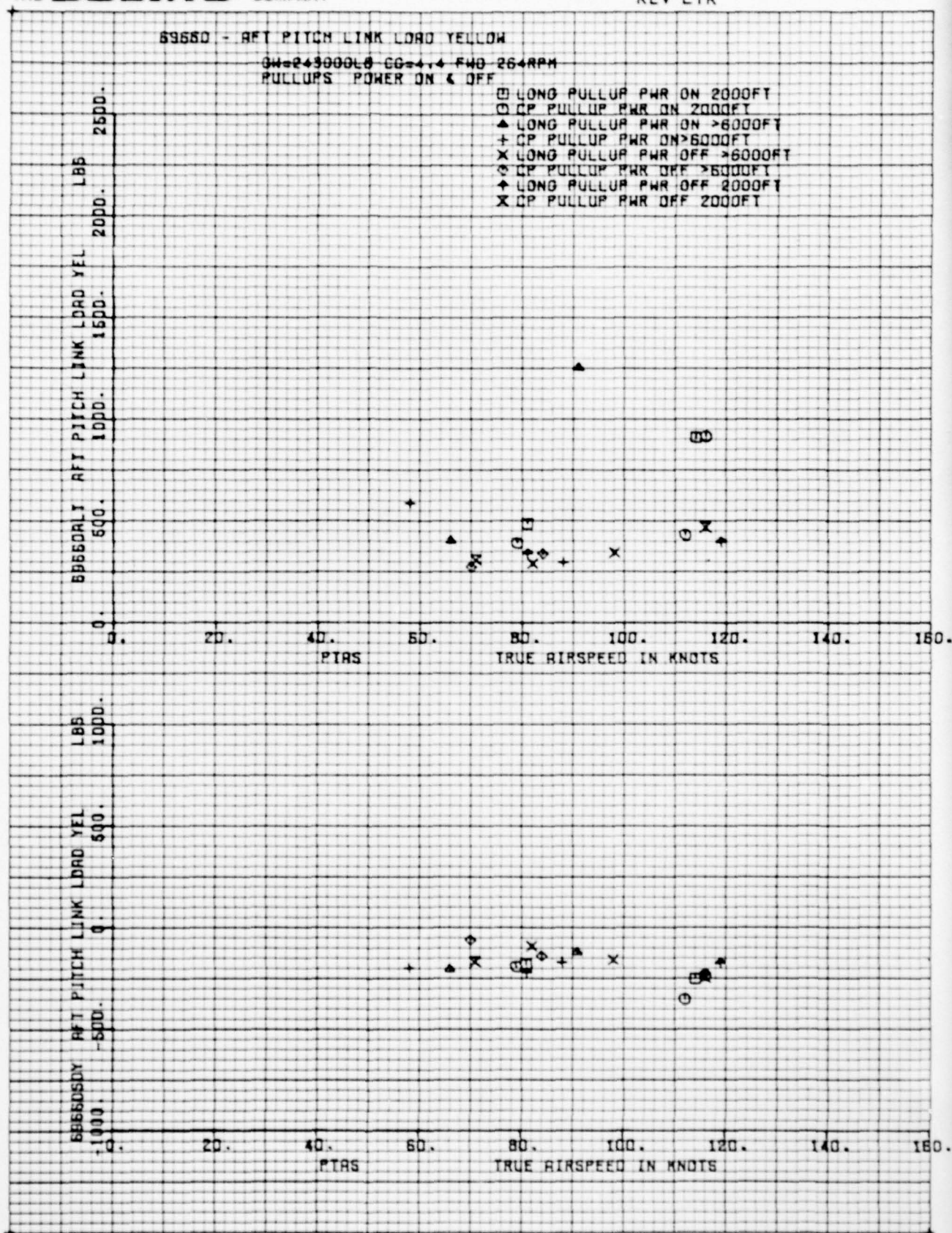
FORM 52300 (10/71)

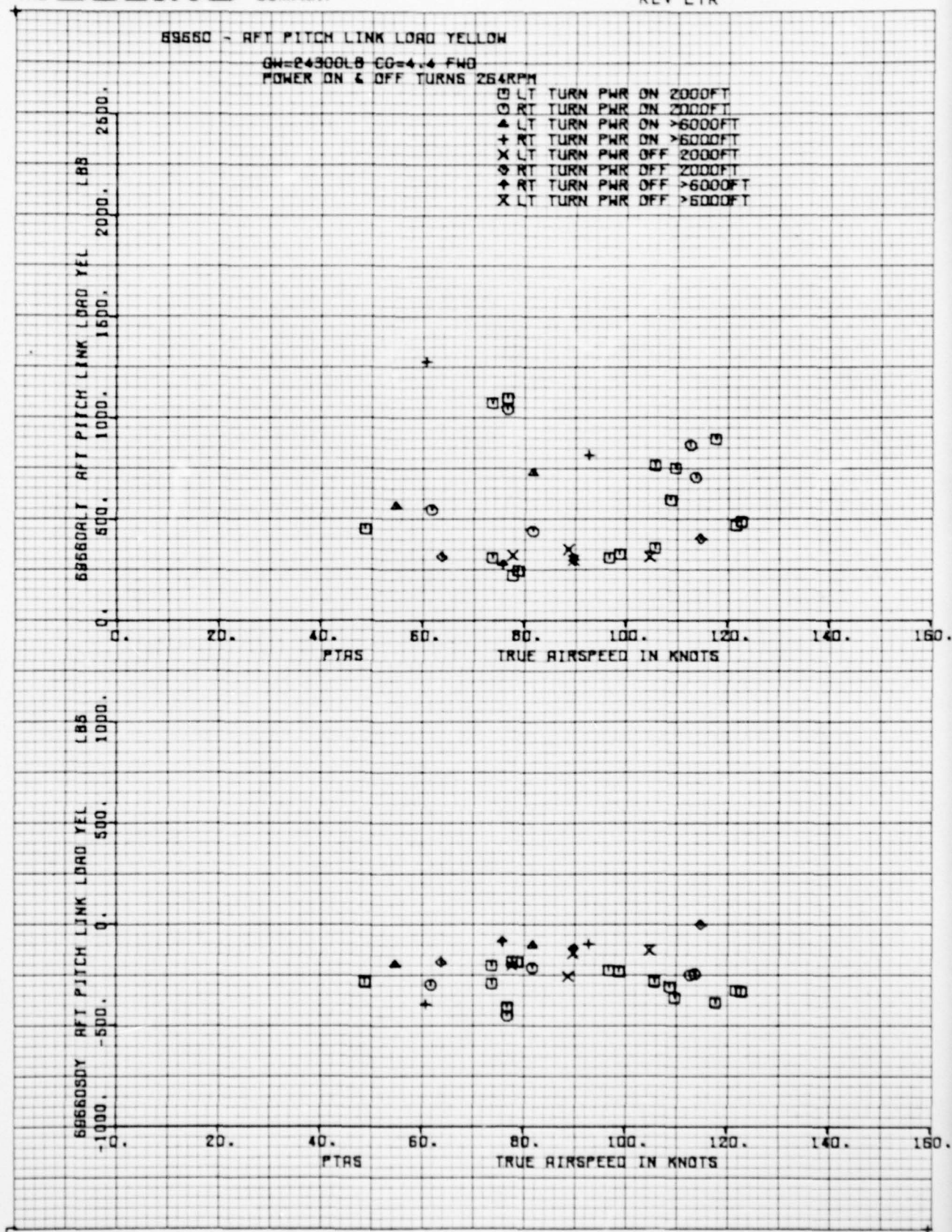




FORM 52300 (10/71)





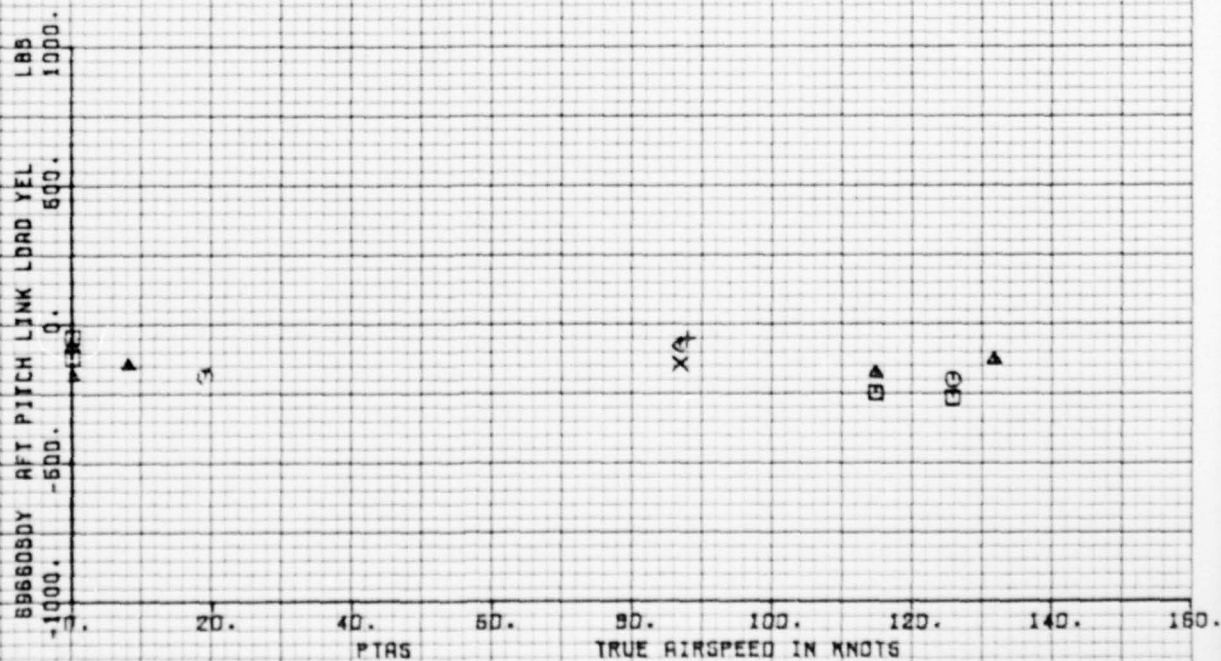
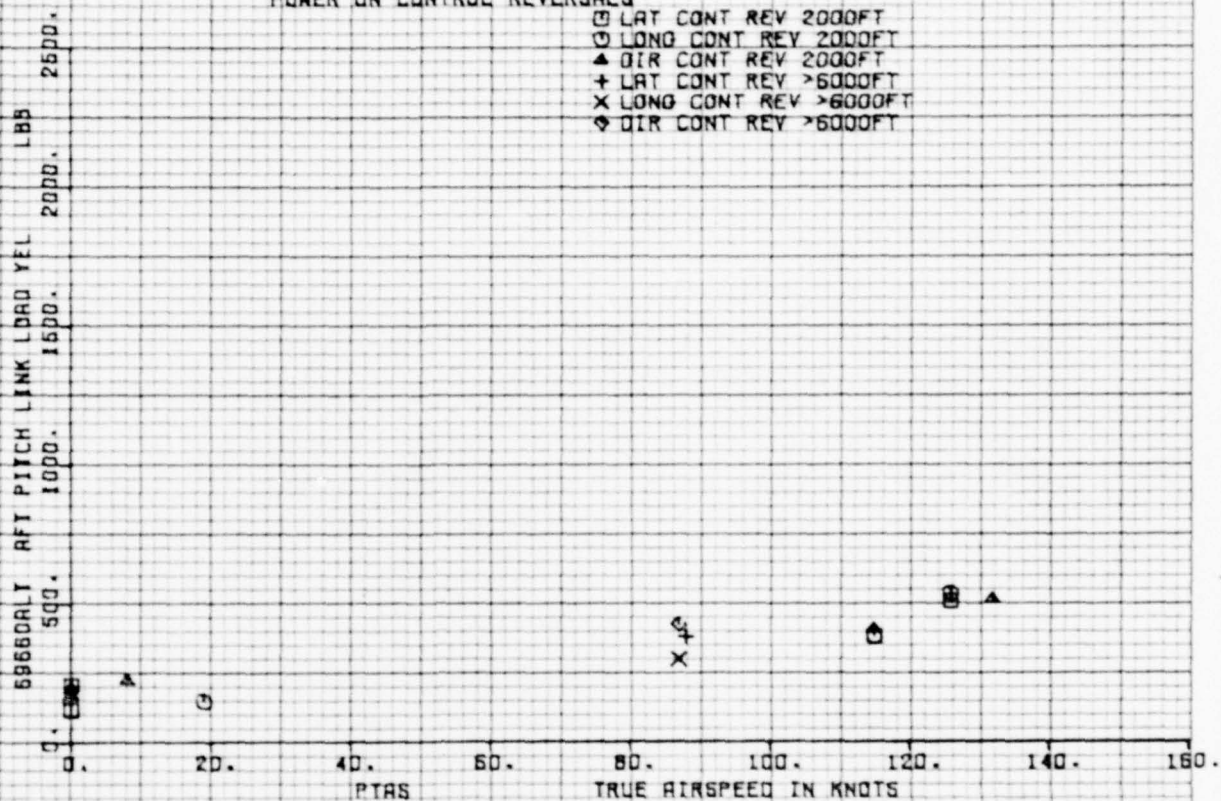


THE **BOEING** COMPANY

69660 - AFT PITCH LINK LOAD YELLOW

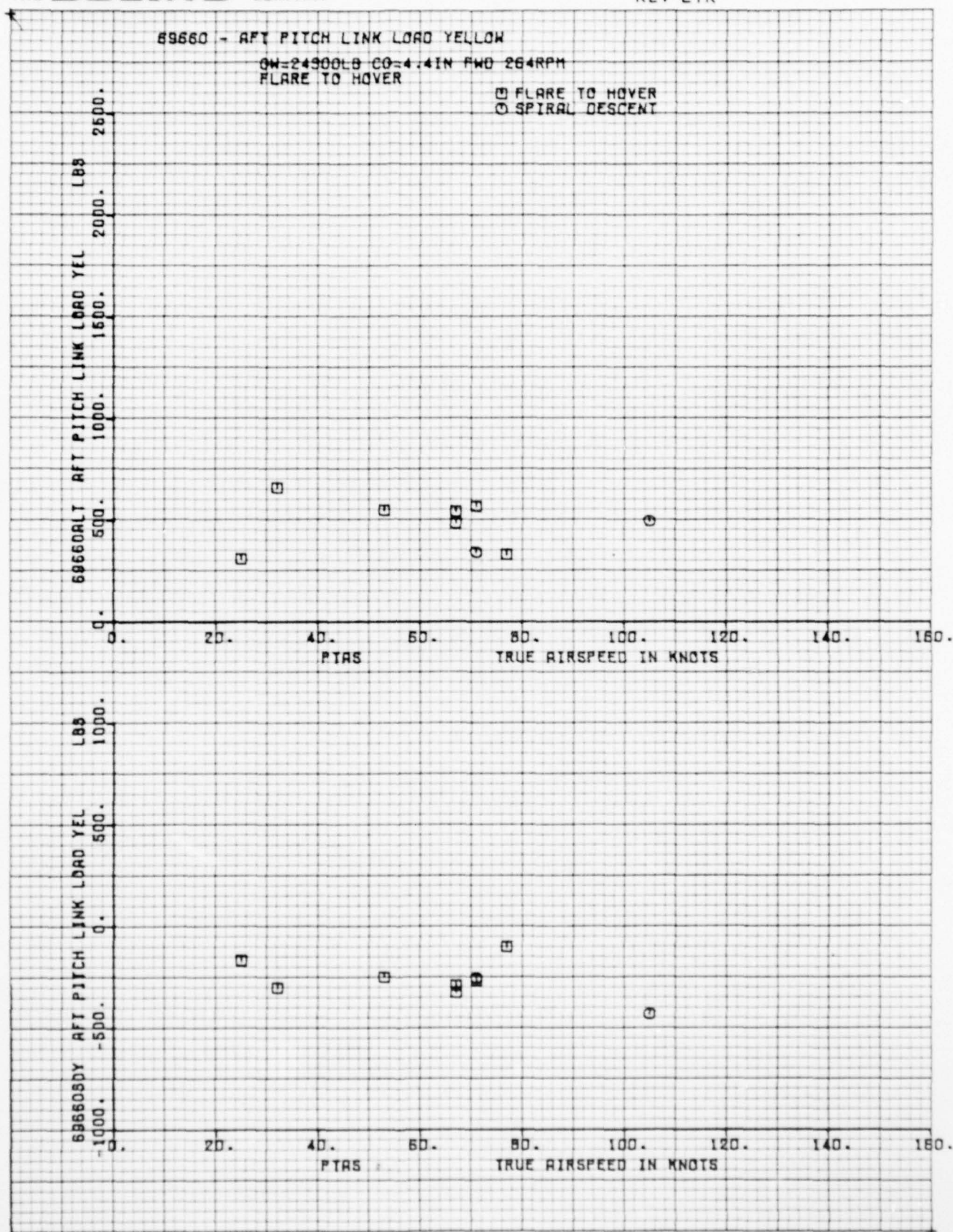
GW=24300LB CG=4.41N FWD
POWER ON CONTROL REVERSALS

- LAT CONT REV 2000FT
- LONG CONT REV 2000FT
- ▲ DIR CONT REV 2000FT
- + LAT CONT REV >6000FT
- × LONG CONT REV >6000FT
- ◇ DIR CONT REV >6000FT



THE **BOEING** COMPANY

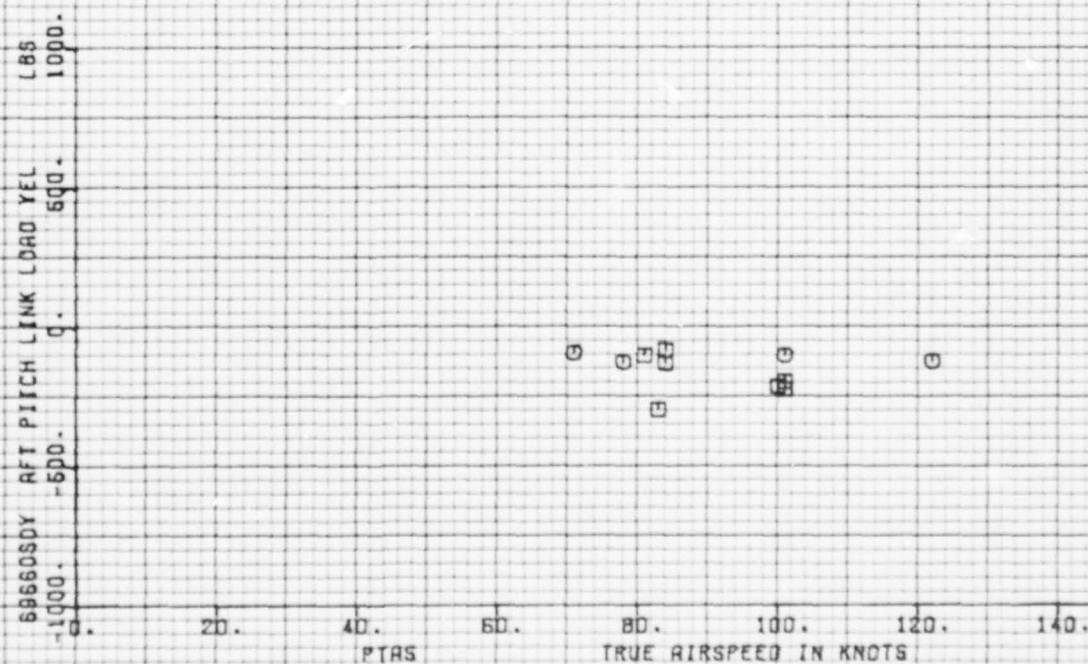
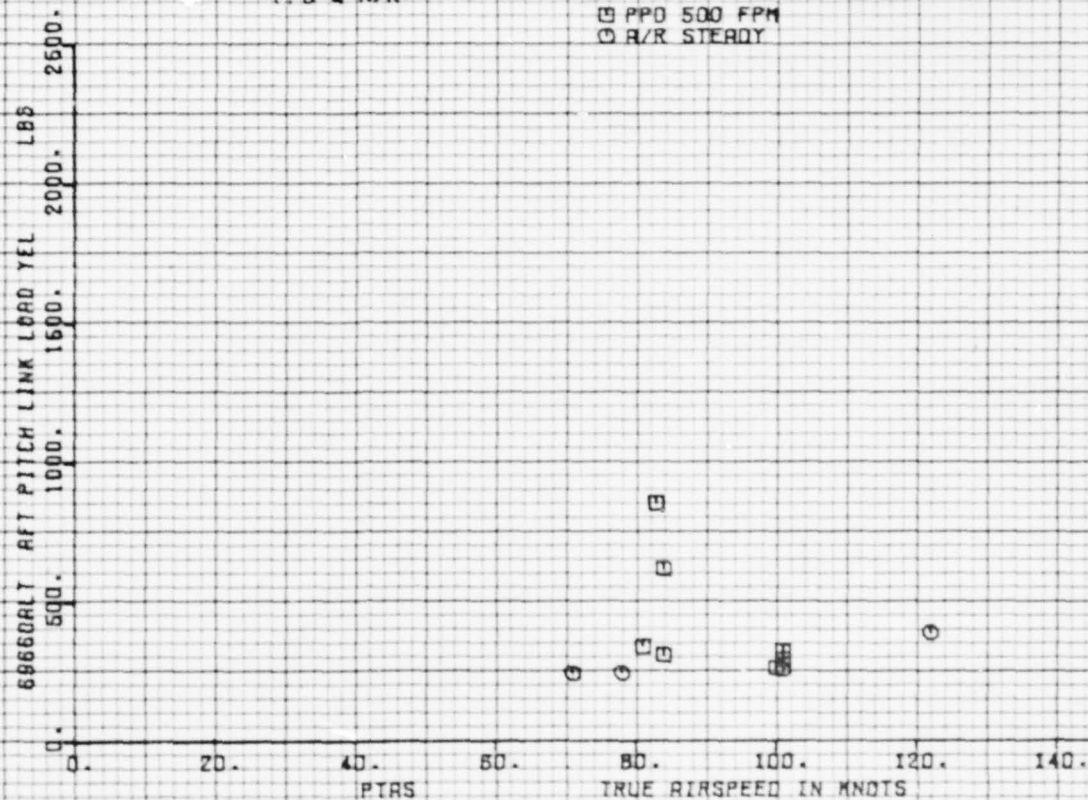
69660 - AFT PITCH LINK LOAD YELLOW

GW=24500LB CO=4.4IN FWD 264RPM
FLARE TO HOVER□ FLARE TO HOVER
○ SPIRAL DESCENT

FORM 52300 (10/71)

THE **BOEING** COMPANY

59660 - AFT PITCH LINK LOAD YELLOW

GW 24300LB CG=4.4IN FWD 264RPM
PPD & A/R□ PPD 500 FPM
○ A/R STEADY

AD-A075 616

BOEING VERTOL CO PHILADELPHIA PA

F/G 1/3

CH-46 COMPOSITE ROTOR BLADE FLIGHT STRESS SURVEY DATA. VOLUME V--ETC(U)

1978 R AIELLO, J BENDO

N00019-75-C-0396

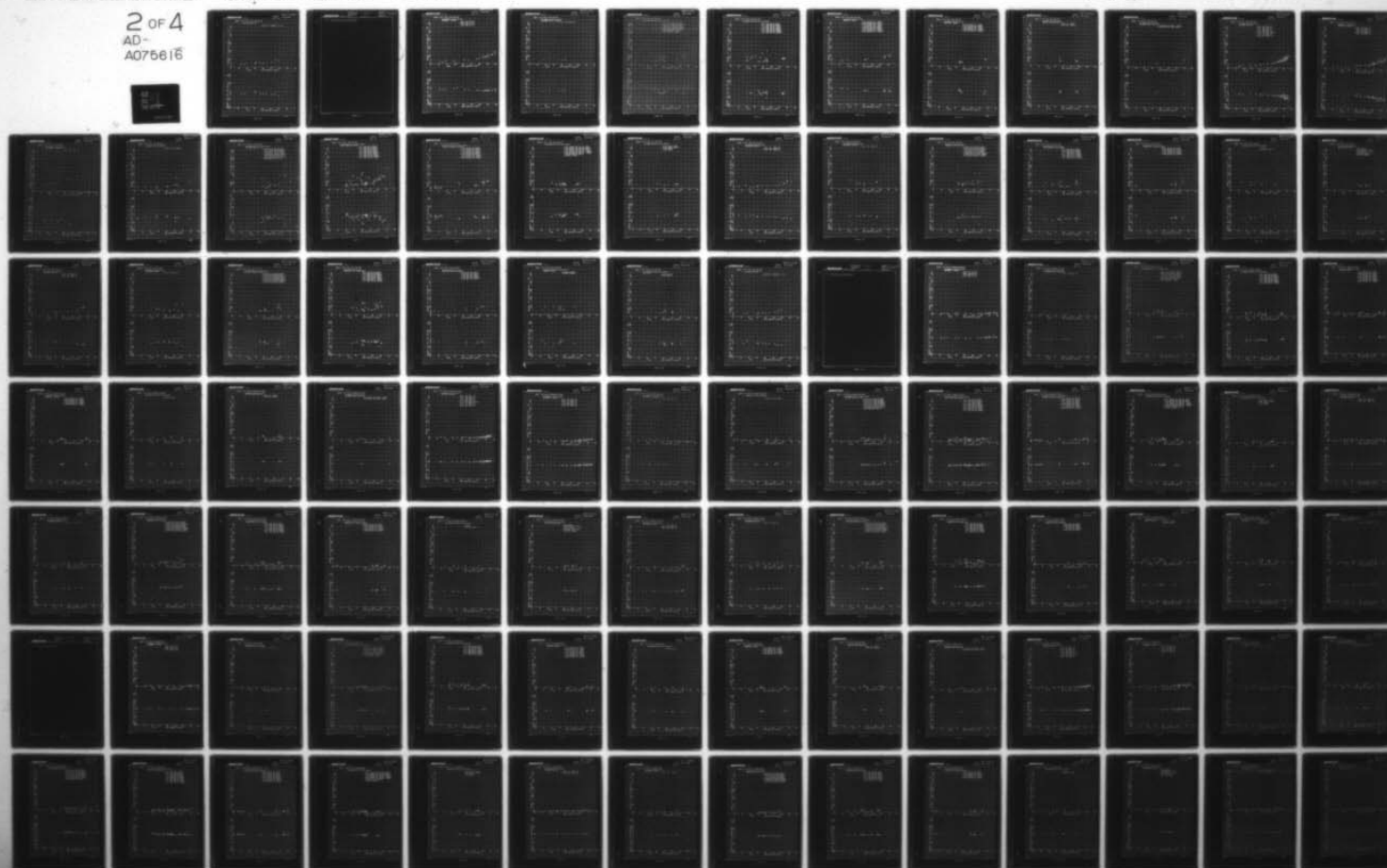
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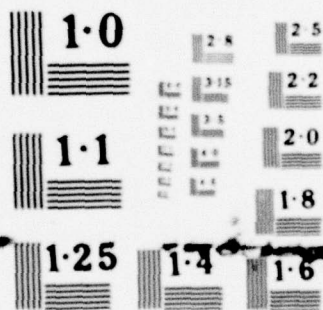
D210-11168-3-VOL-7

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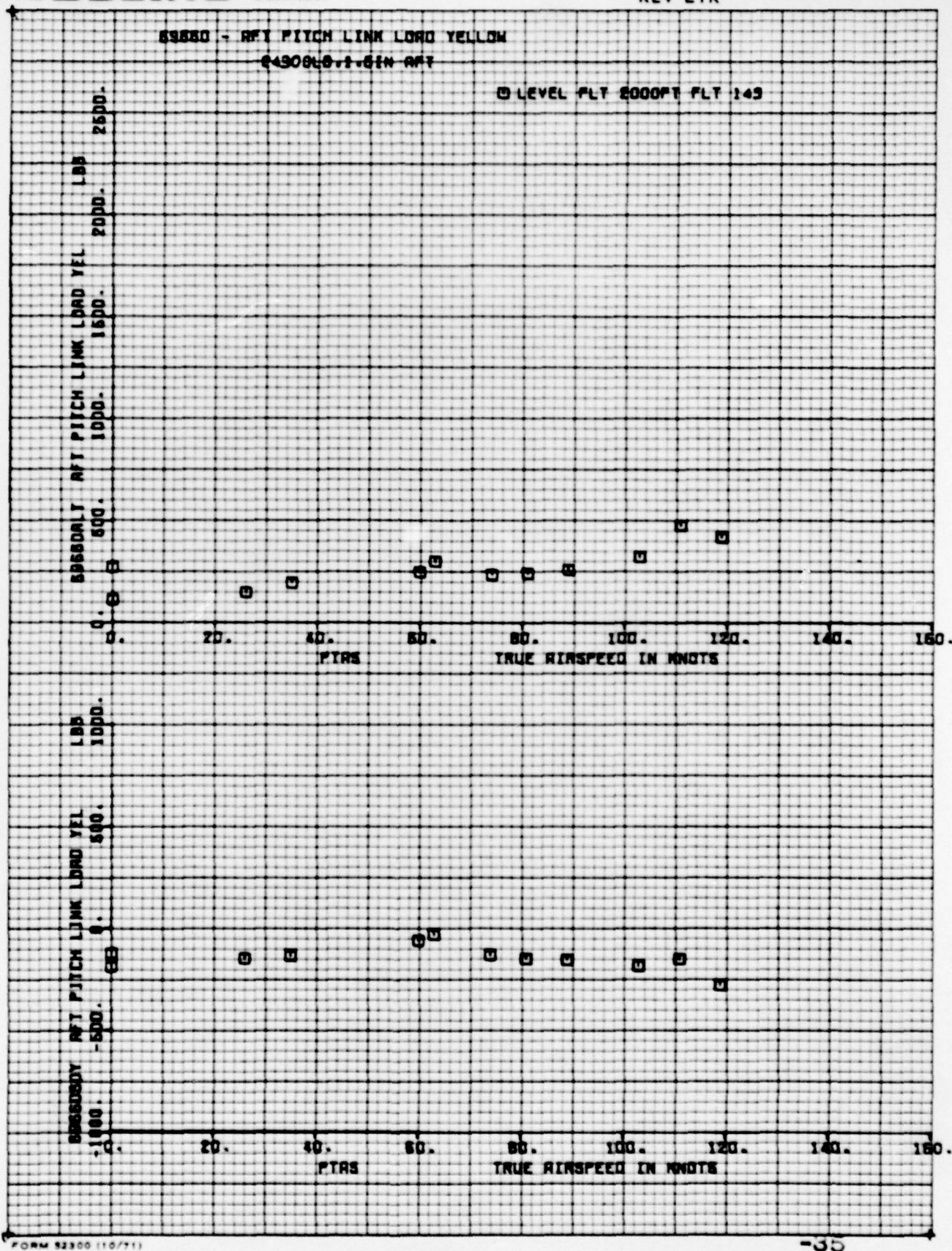
2 OF 4

AD-A075616





NATIONAL BUREAU OF STANDARDS
MICROCOPY RESOLUTION TEST CHART

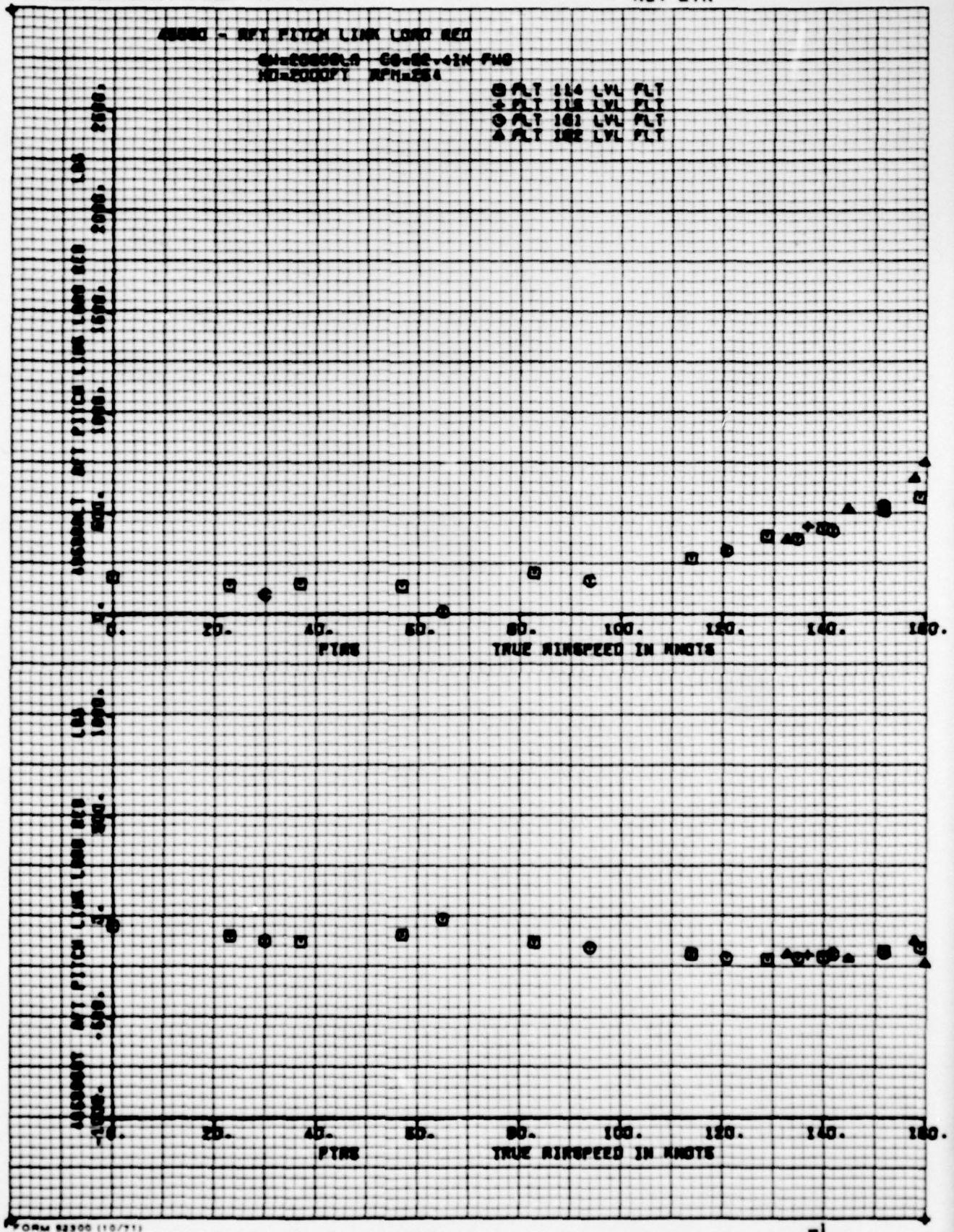


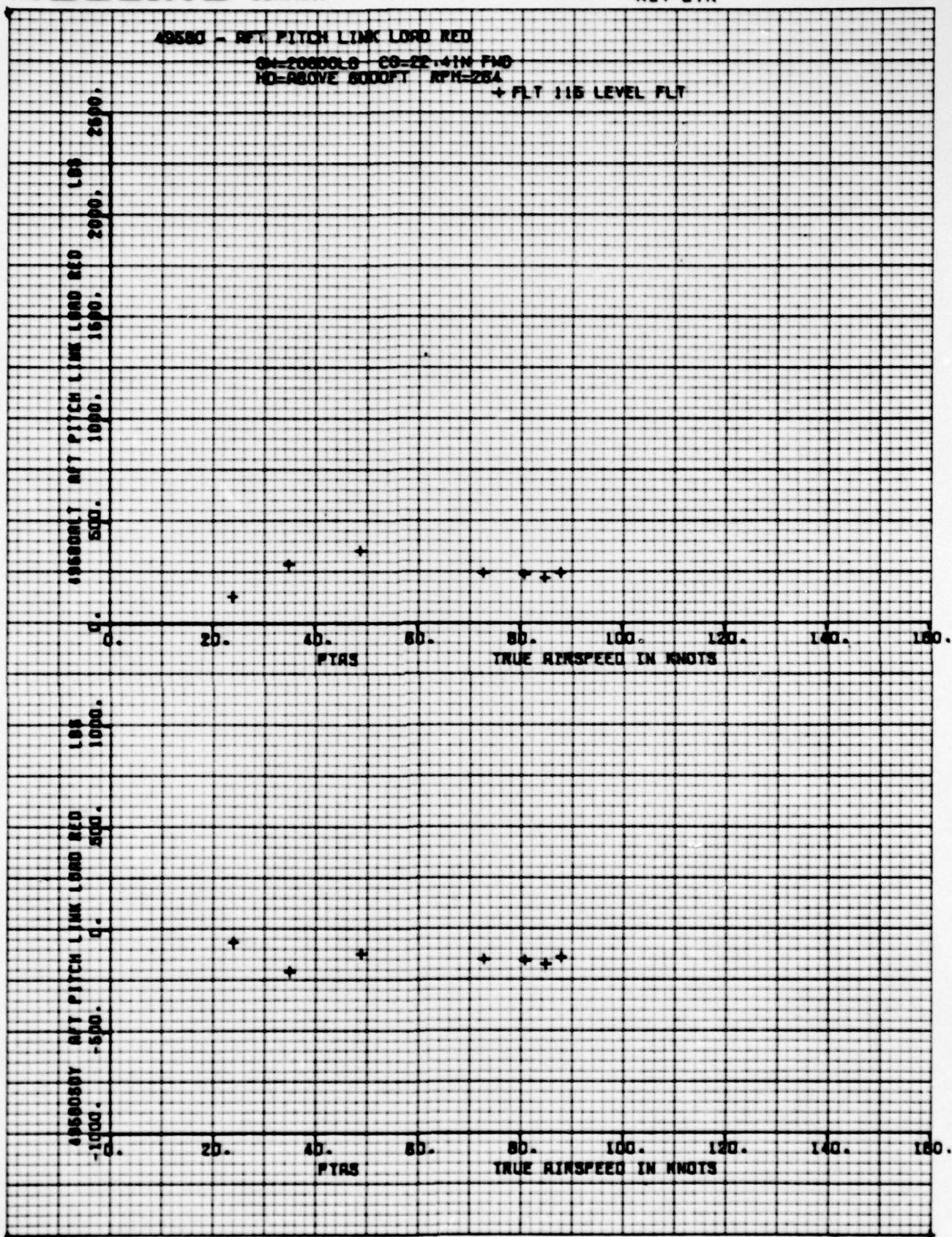
THE **BOEING** COMPANY

PREPARED BY: J. Bendo
CHECKED BY:
DATE: 8/28/78

NUMBER D210-11168-3
REV LTR Volume 7
MODEL NO.

4.3 Aft Pitch Link, Red Blade





FORM 52300 (10/71)

49590 - APT PITCH LINK LOAD RED

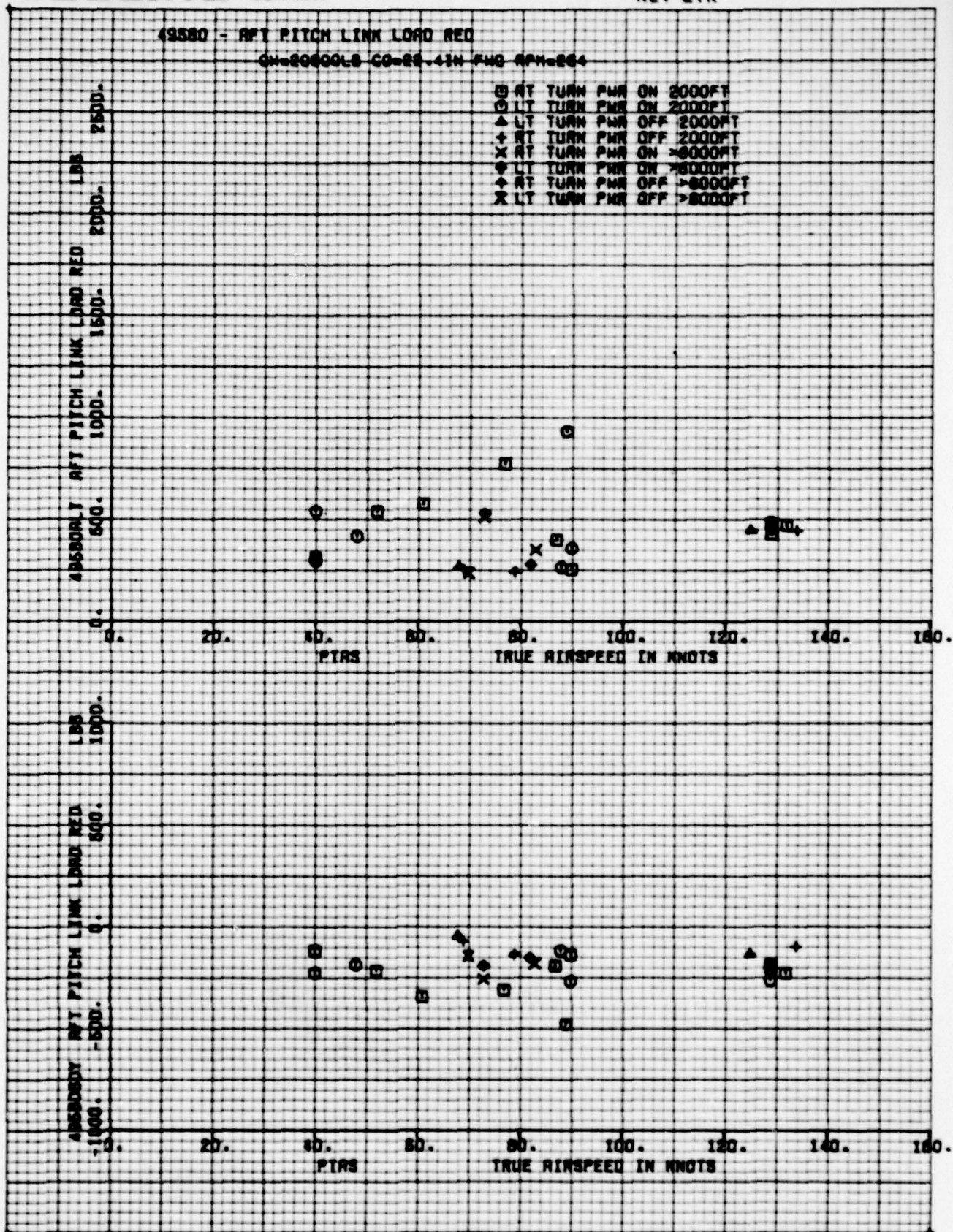
04-000000-0 60-20-41N FWS APR-204

01 GP PULLUP PWR ON >6000FT
01NG PULLUP PWR ON >6000FT
▲ GP PULLUP PWR ON 2000FT
+ 1NG PULLUP PWR ON 2000FT
X 1NG PULLUP PWR OFF 2000FT
* 1NG PULLUP PWR OFF 2000FT
▲ APO RECOVERY >6000FT
X APO RECOVERY 2000FT

49590 - APT PITCH LINK LOAD RED

04-000000-0 60-20-41N FWS APR-204

01 GP PULLUP PWR ON >6000FT
01NG PULLUP PWR ON >6000FT
▲ GP PULLUP PWR ON 2000FT
+ 1NG PULLUP PWR ON 2000FT
X 1NG PULLUP PWR OFF 2000FT
* 1NG PULLUP PWR OFF 2000FT
▲ APO RECOVERY >6000FT
X APO RECOVERY 2000FT



THE **BOEING** COMPANY

48880 - RPT PITCH LINK LOAD REQ

GM-30800LS CO-22-4IN FWD
TOWER ON 284RPM

O LAT CONTROL REV 2000FT
 O LONG CONTROL REV 2000FT
 ▲ DIR CONTROL REV 2000FT
 + LAT CONTROL REV 8000FT
 X LONG CONTROL REV 8000FT
 ◆ DIR CONTROL REV 8000FT
 ◆ LAT CONTROL REV >8000FT
 X LONG CONTROL REV >8000FT
 Z DIR CONTROL REV >8000FT

ABSOLUTELY RPT PITCH LINK LOAD REQ LBS

ABSOLUTELY RPT PITCH LINK LOAD REQ LBS

20. 40. 60. 80. 100. 120. 140. 160.
TAS

TRUE AIRSPEED IN KNOTS

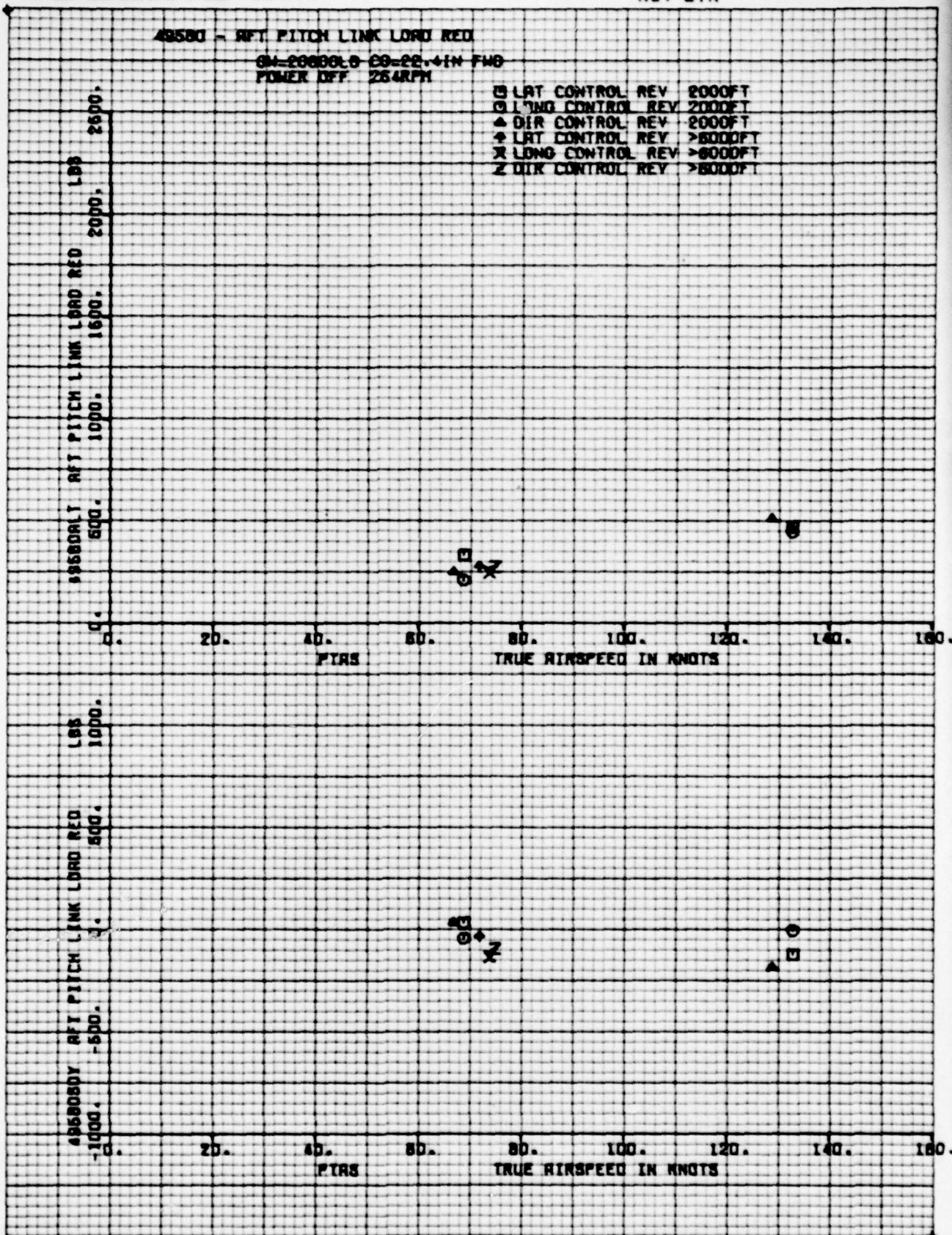
20. 40. 60. 80. 100. 120. 140. 160.
TAS

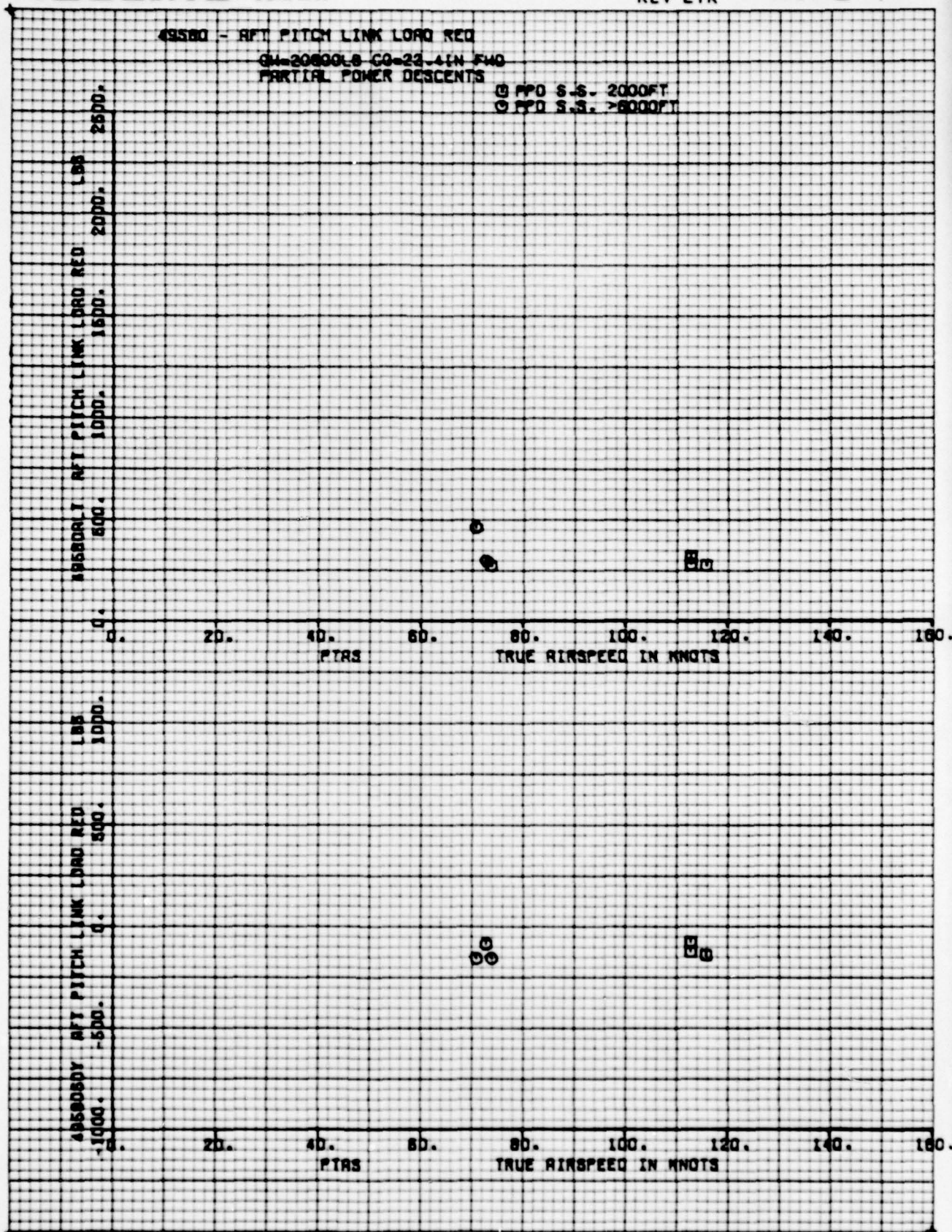
TRUE AIRSPEED IN KNOTS

FORM 52300 (10/71)

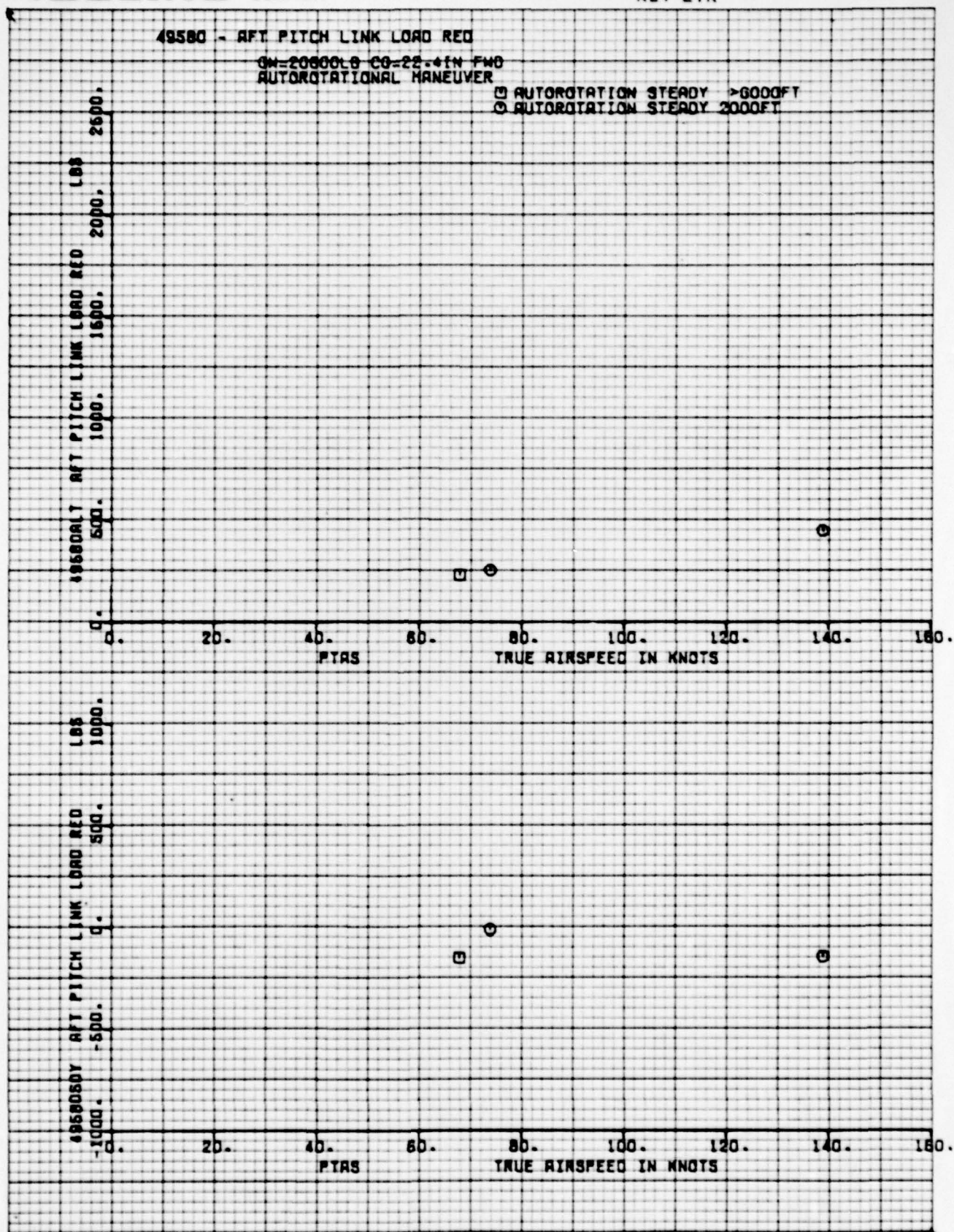
SHEET 102

-19

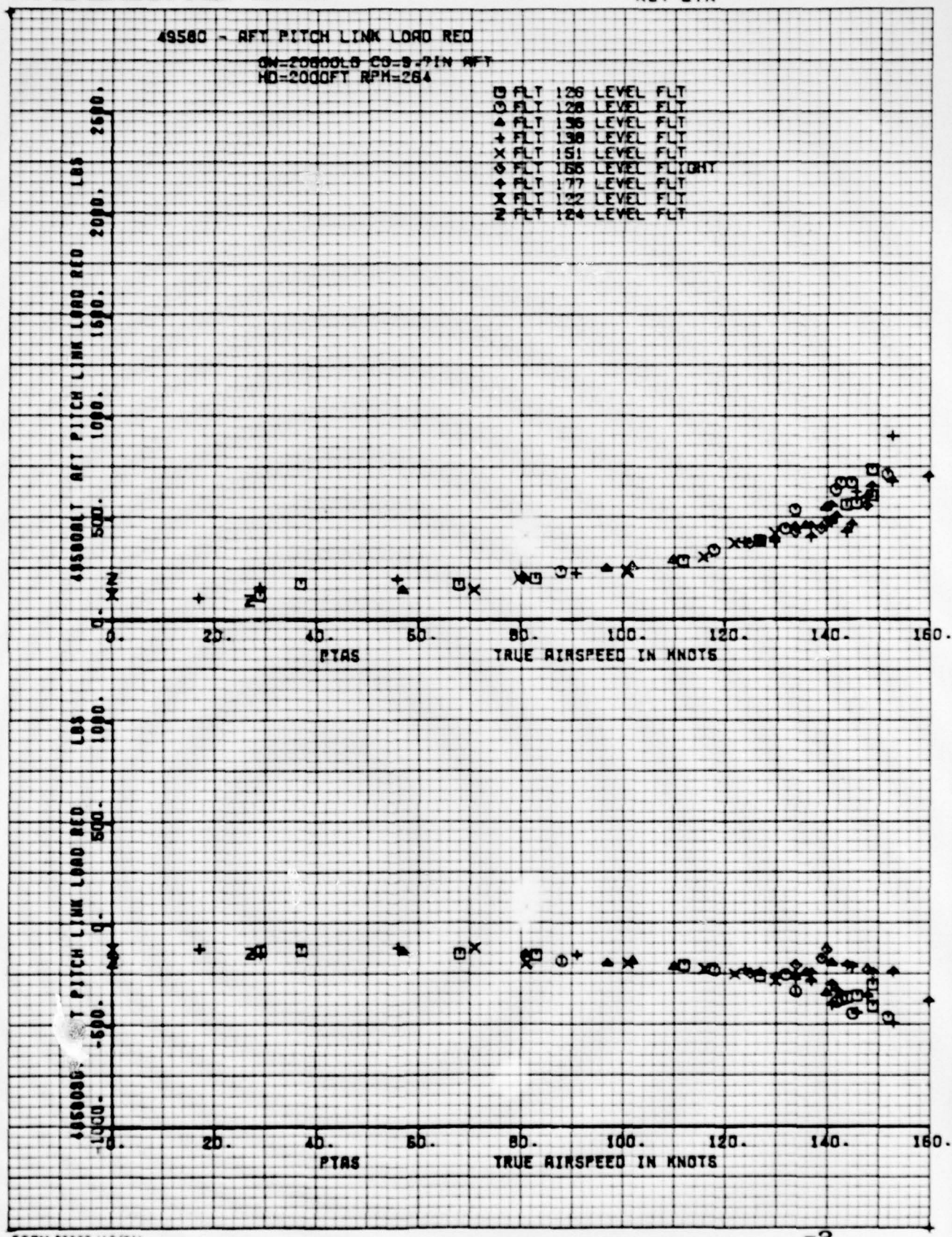




FORM 52300 (10/71)

THE **BOEING** COMPANY

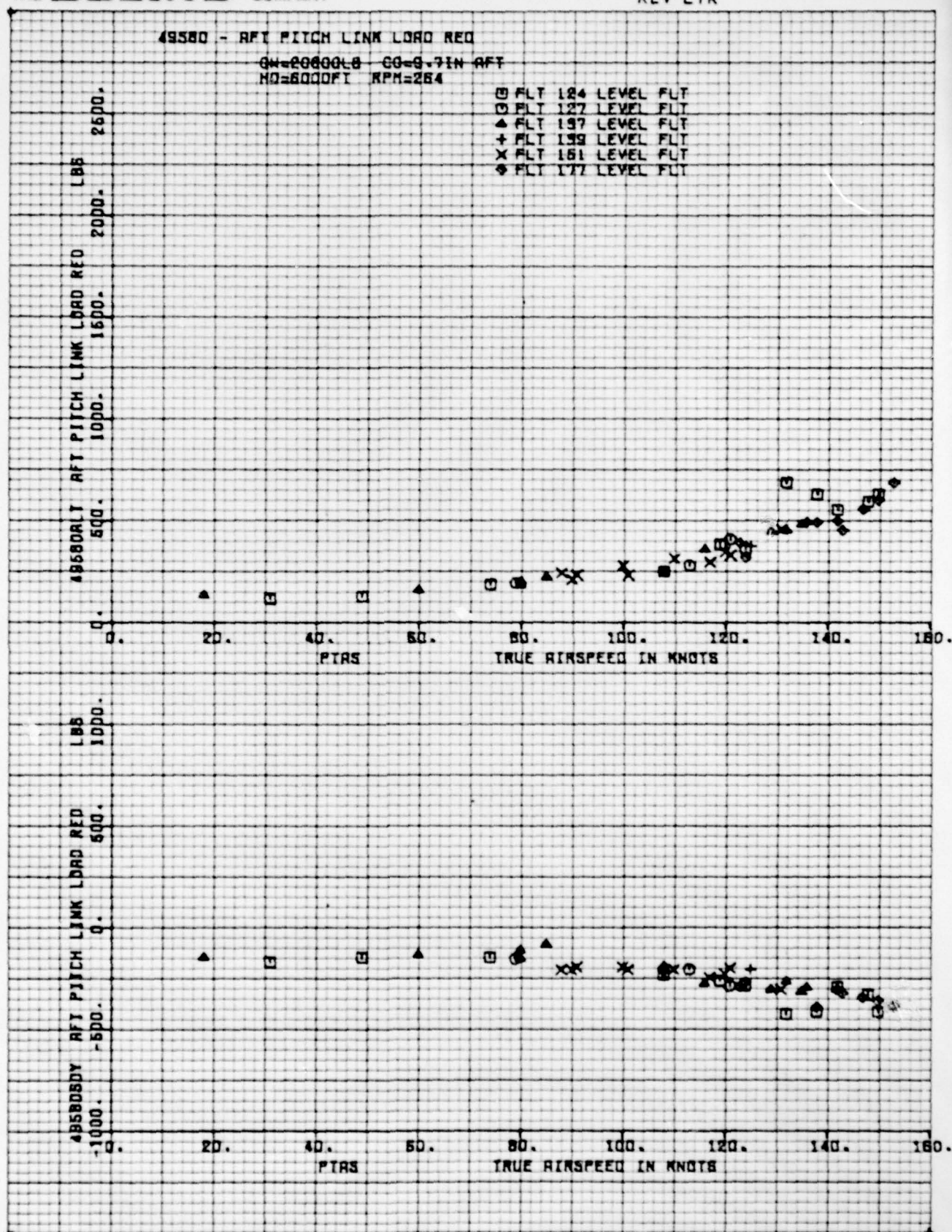
FORM 52100 (10/71)

THE **BOEING** COMPANYNUMBER 1 VOLUME 7
REV LTR

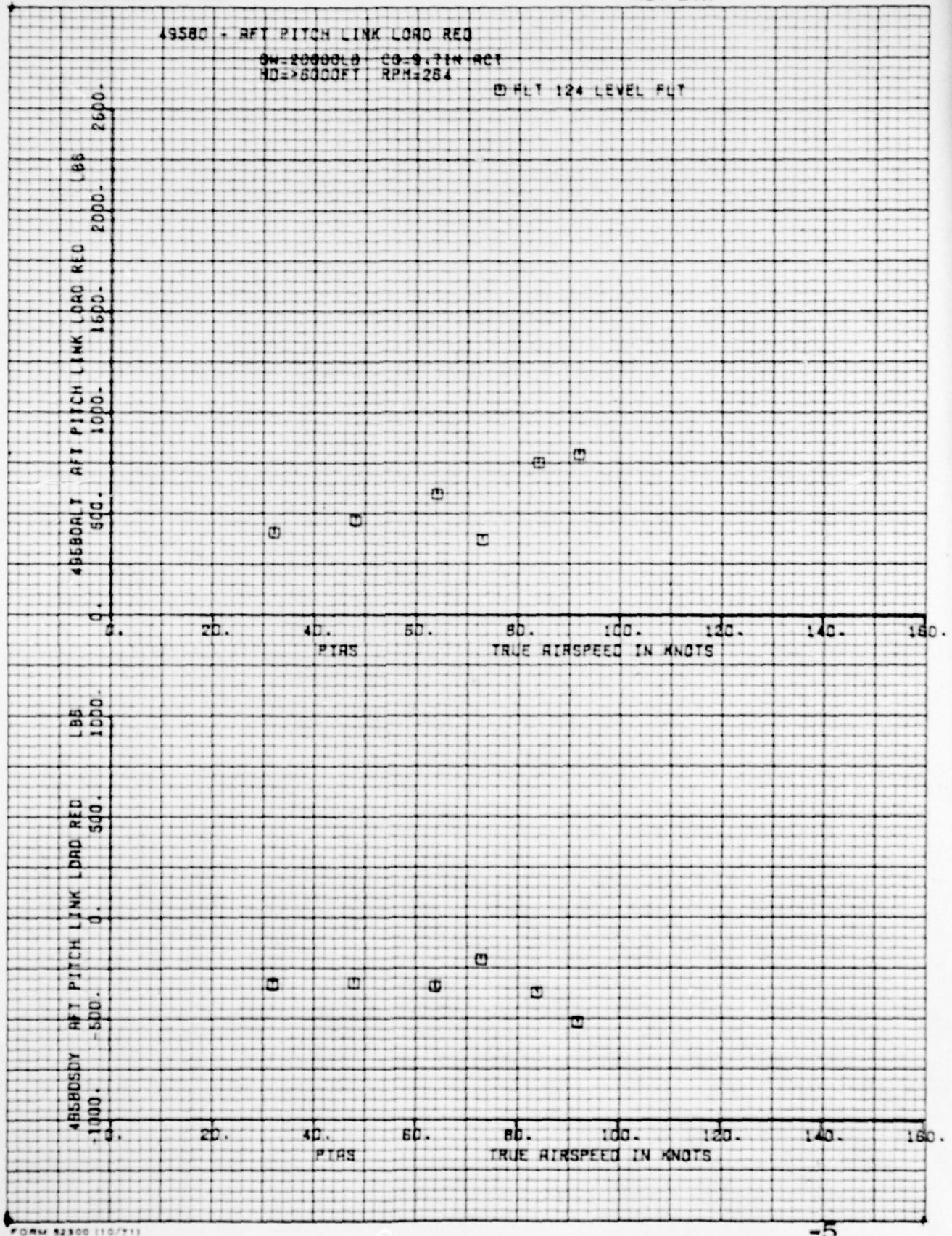
FORM 52300 (10/71)

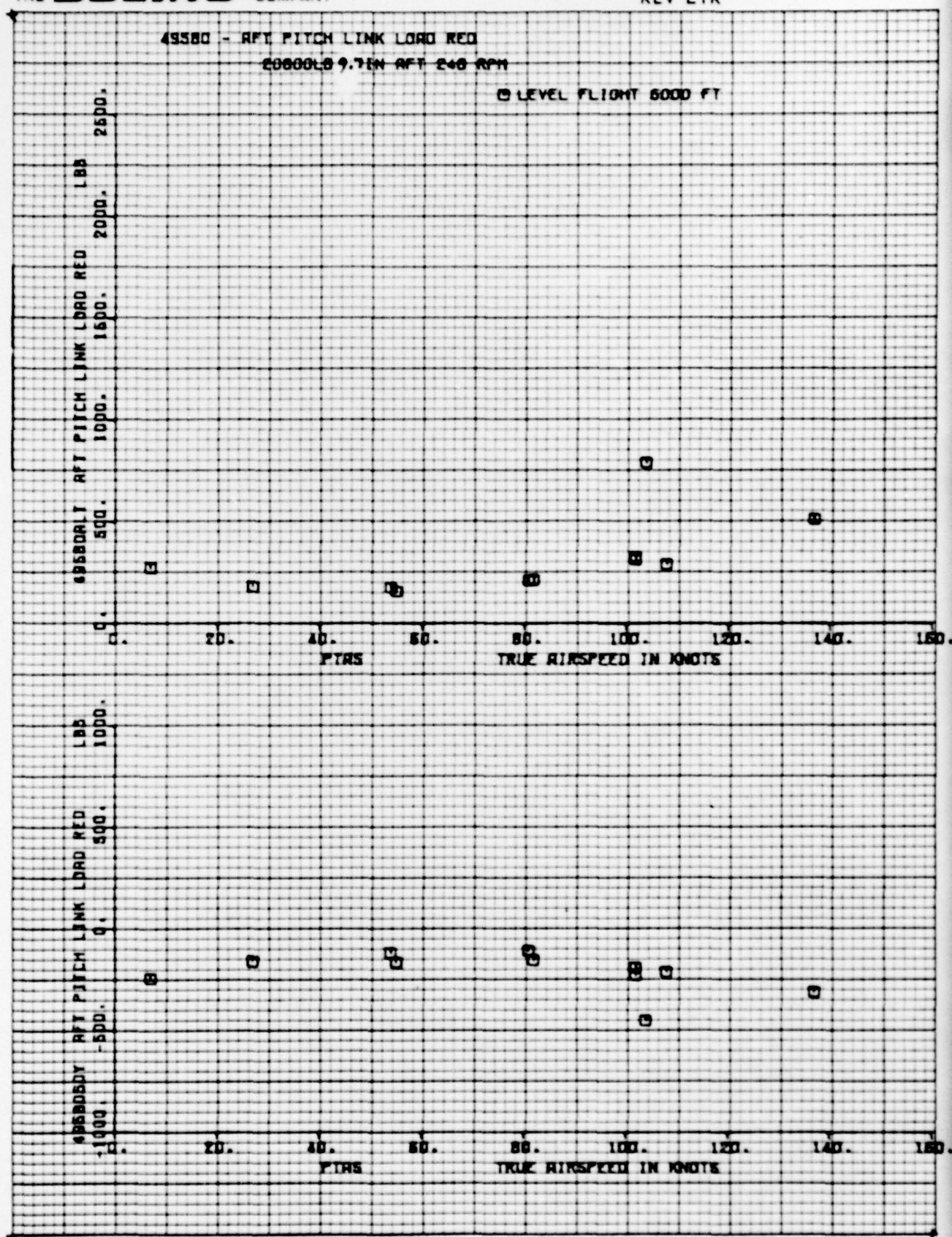
SHEET 106

-2

THE **BOEING** COMPANY

FORM 52300 (10/71)



THE **BOEING** COMPANY

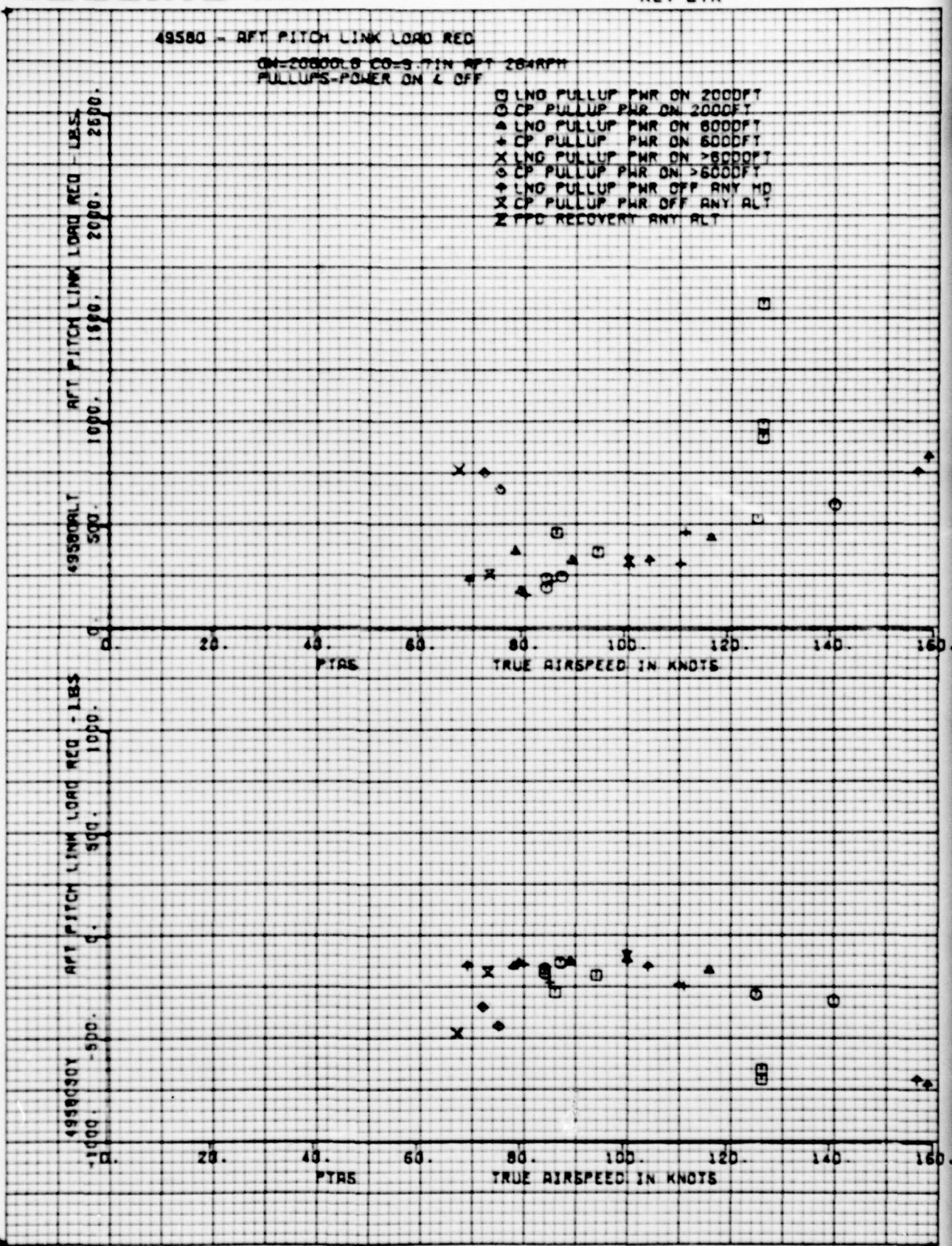
FORM 82900 (10/71)

THE **BOEING** COMPANY

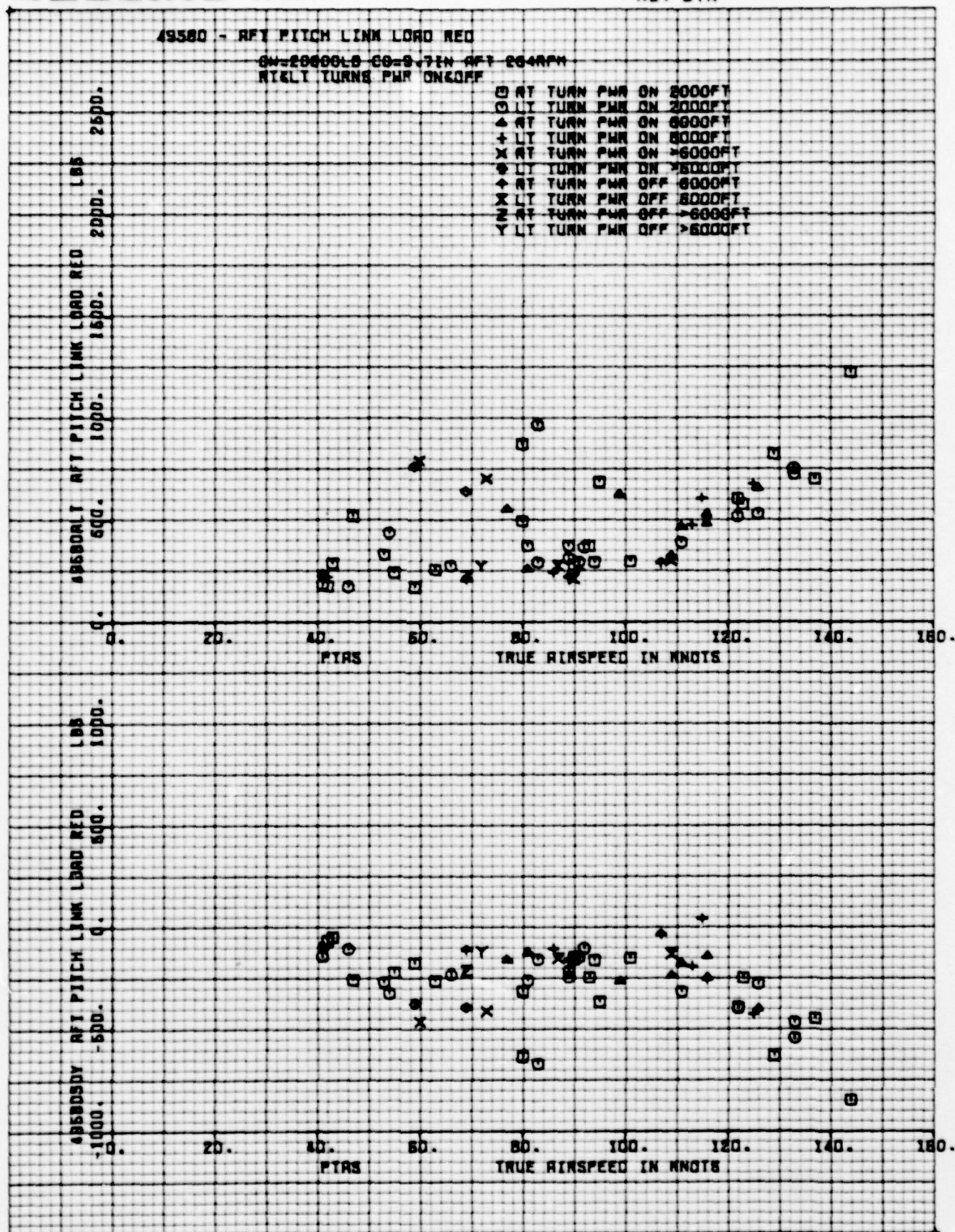
49580 - AFT PITCH LINK LOAD REQ

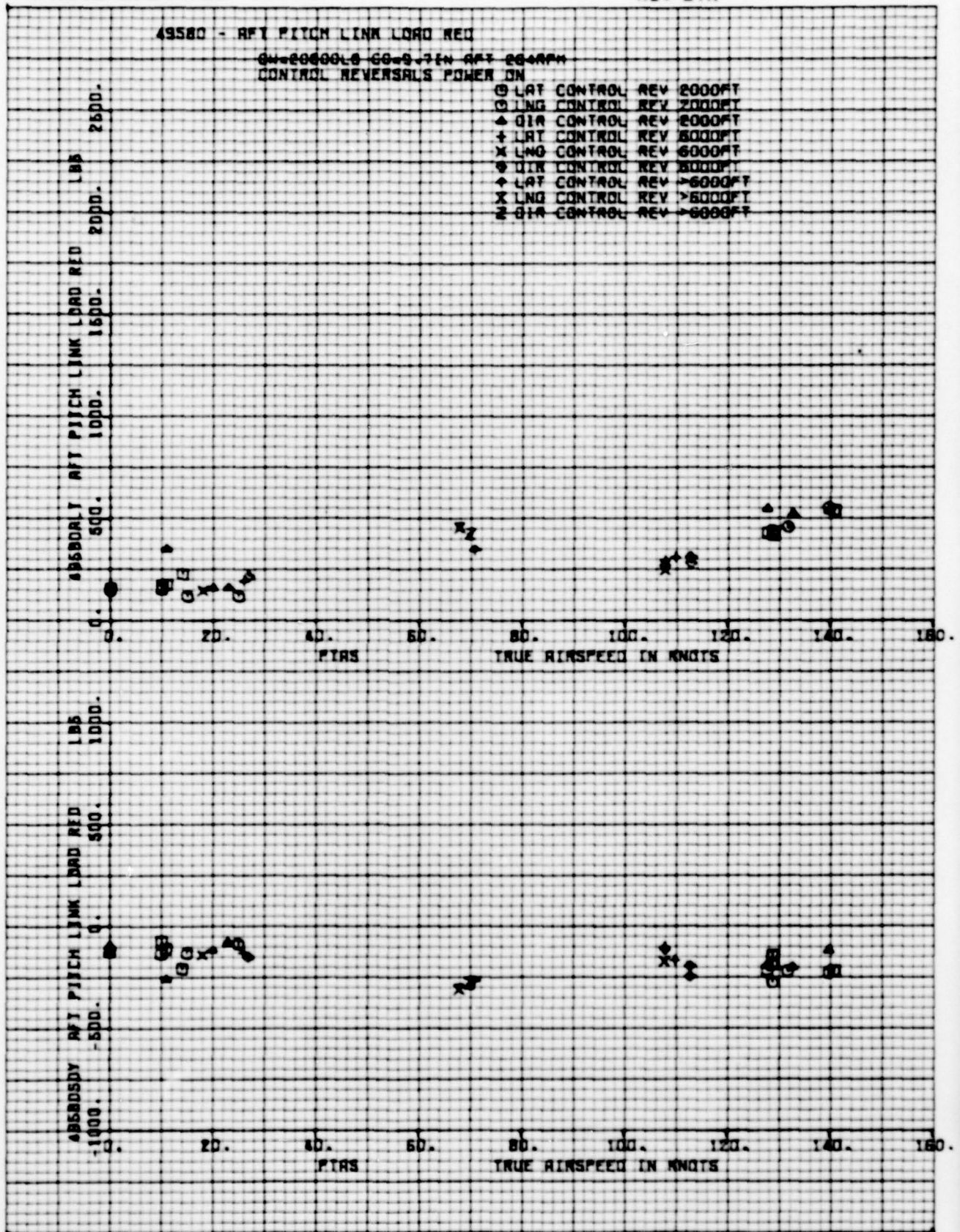
ON=20000LB CO=9.7IN APT 284RPM
PULLUPS-POWER ON & OFF

- LNO PULLUP PWR ON 2000FT
- CP PULLUP PWR ON 2000FT
- ▲ LNO PULLUP PWR ON 6000FT
- ♦ CP PULLUP PWR ON 6000FT
- × LNO PULLUP PWR ON >6000FT
- ◊ CP PULLUP PWR ON >6000FT
- ◆ LNO PULLUP PWR OFF ANY MD
- × CP PULLUP PWR OFF ANY ALT
- 2 PPC RECOVERY ANY ALT



FORM 52300 (10/71)





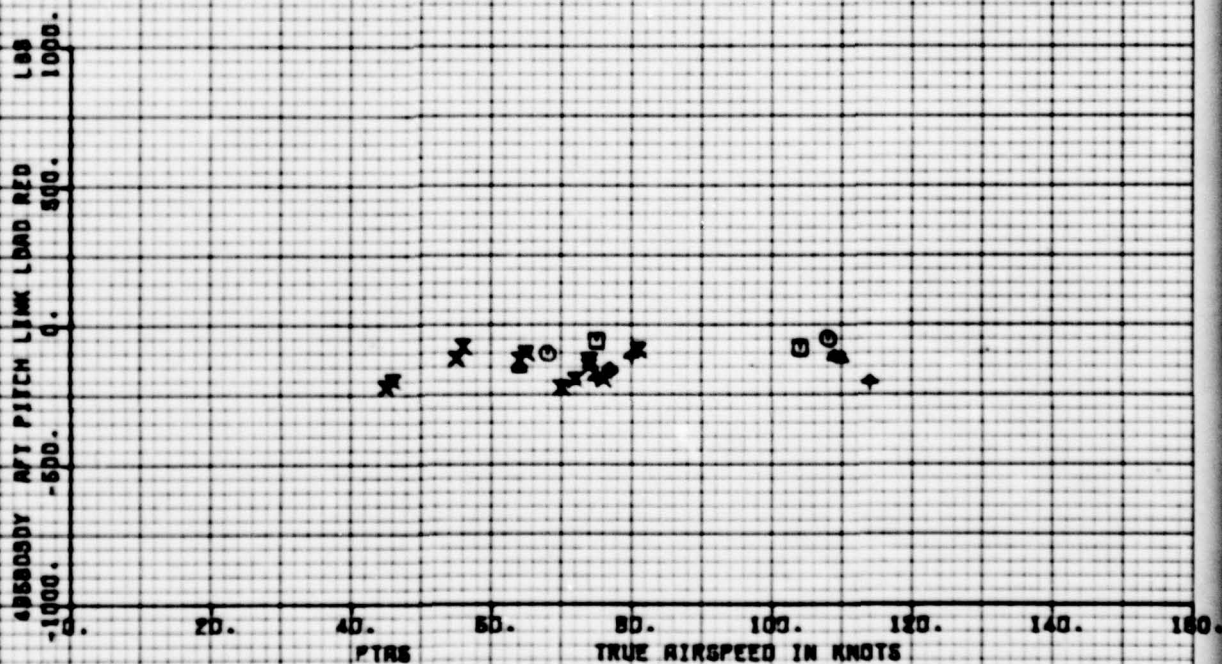
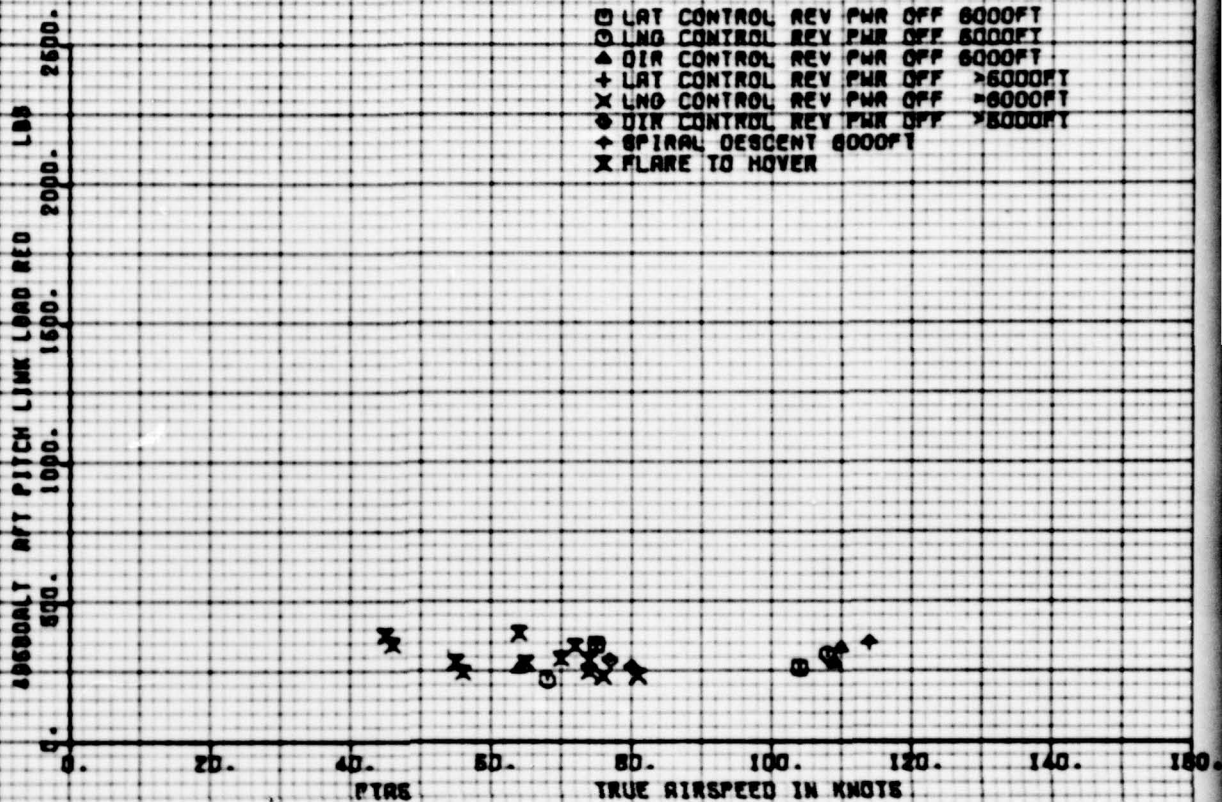
FORM 82900 (10/71)

THE **BOEING** COMPANY

49580 - AFT PITCH LINK LOAD RED

SN=20000L0 CO=8.7IN AFT 264RPH

□ LAT CONTROL REV PWR OFF 8000FT
 ○ LNG CONTROL REV PWR OFF 8000FT
 ▲ DIR CONTROL REV PWR OFF 8000FT
 + LAT CONTROL REV PWR OFF >8000FT
 × LNG CONTROL REV PWR OFF >8000FT
 ● DIR CONTROL REV PWR OFF >8000FT
 + SPIRAL DESCENT 8000FT
 × FLARE TO HOVER

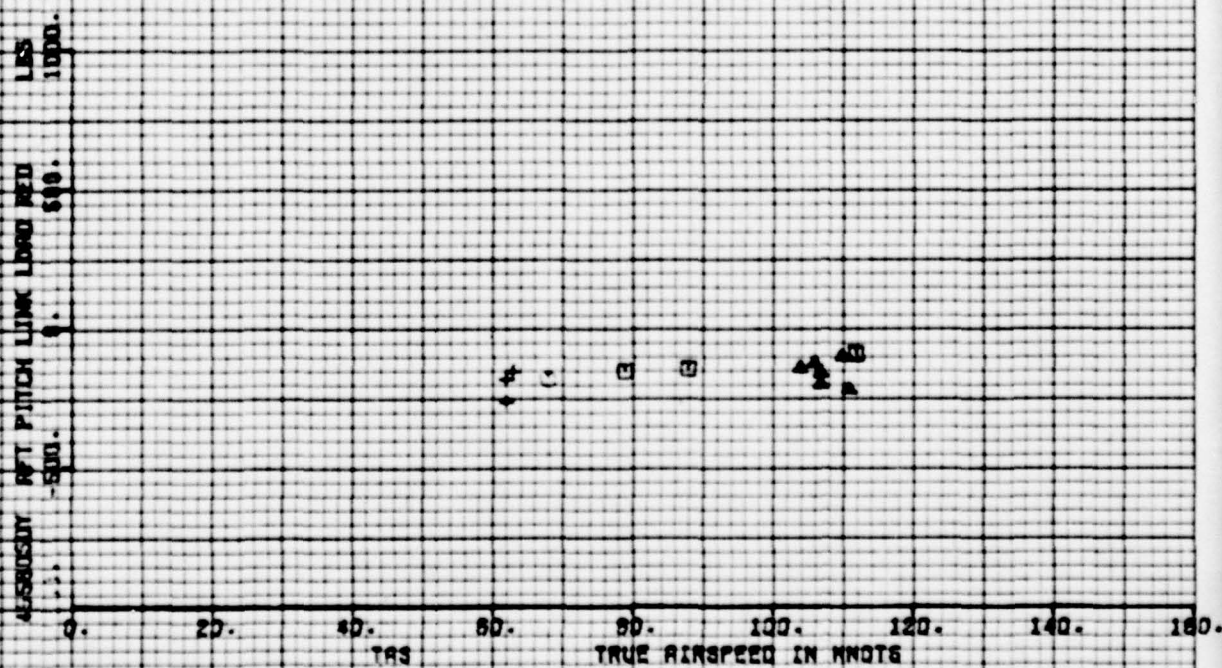
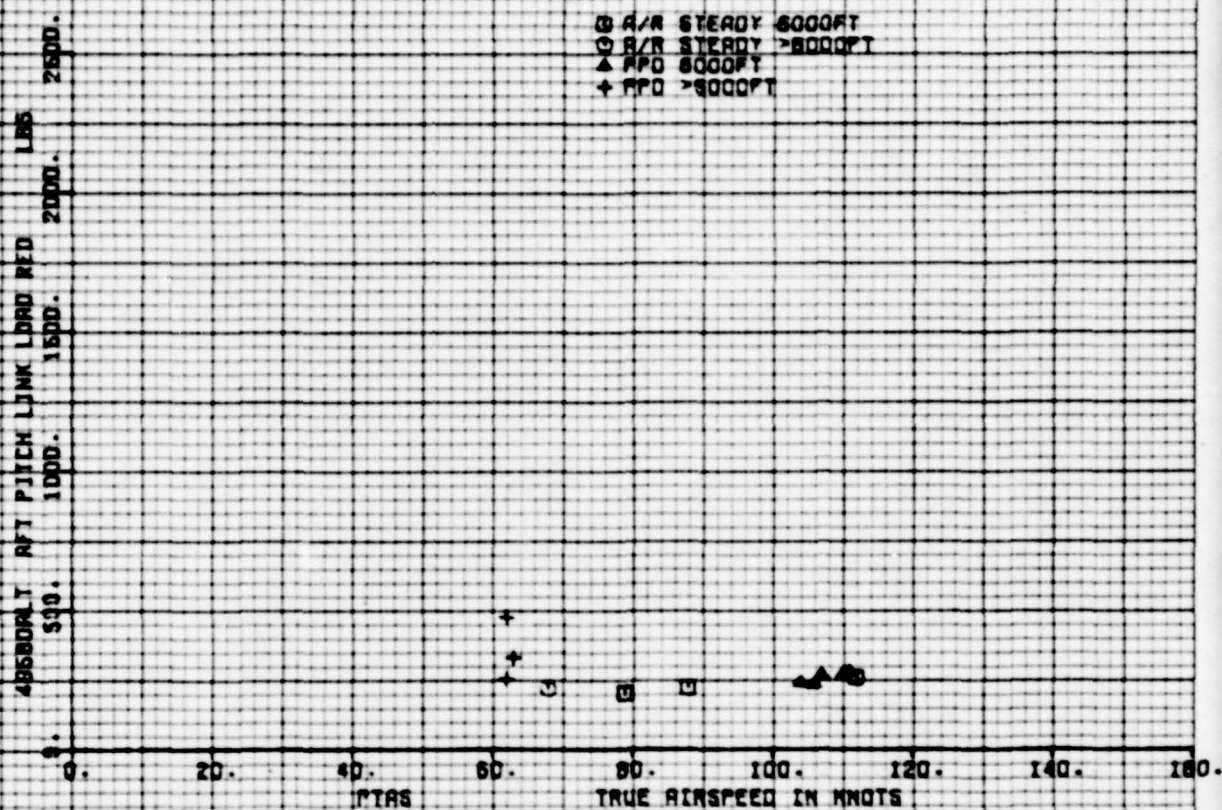


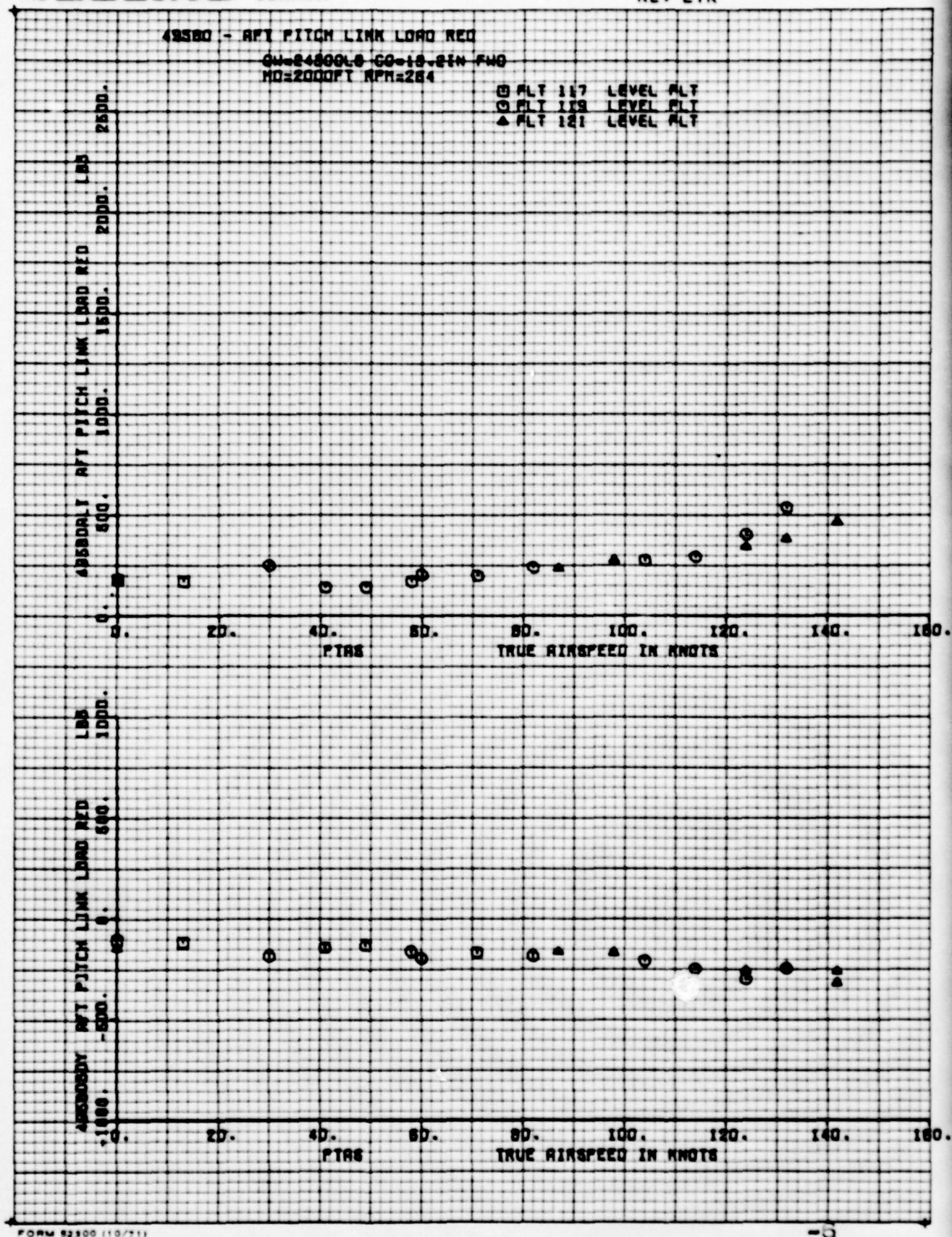
THE **BOEING** COMPANY

49380 - AFT PITCH LINK LOAD REQ

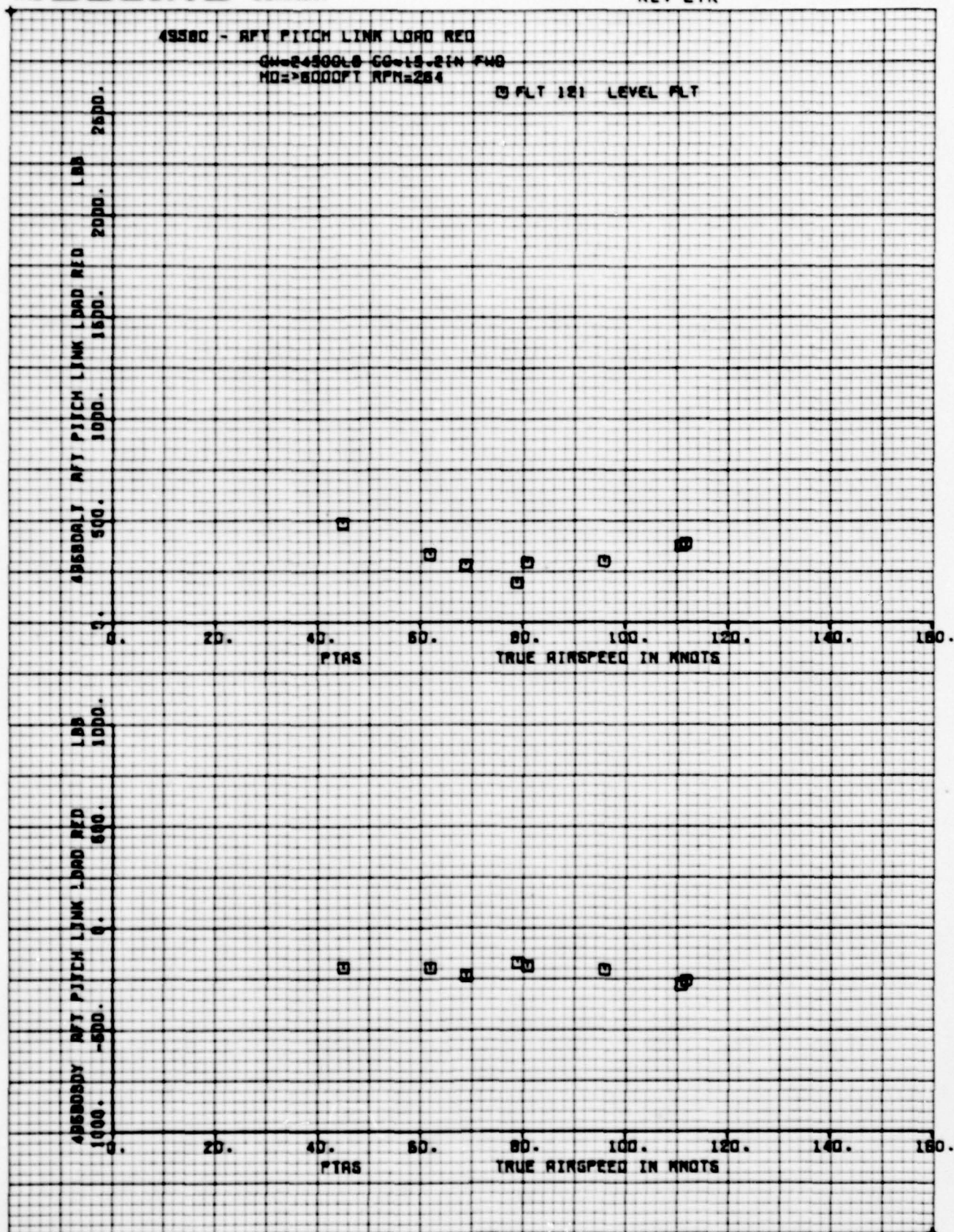
CH-20600LB CO-8.7IN AFT 264RPM

○ A/R STEADY 6000FT
 ⊙ A/R STEADY >6000FT
 ▲ APO 6000FT
 + APO >6000FT

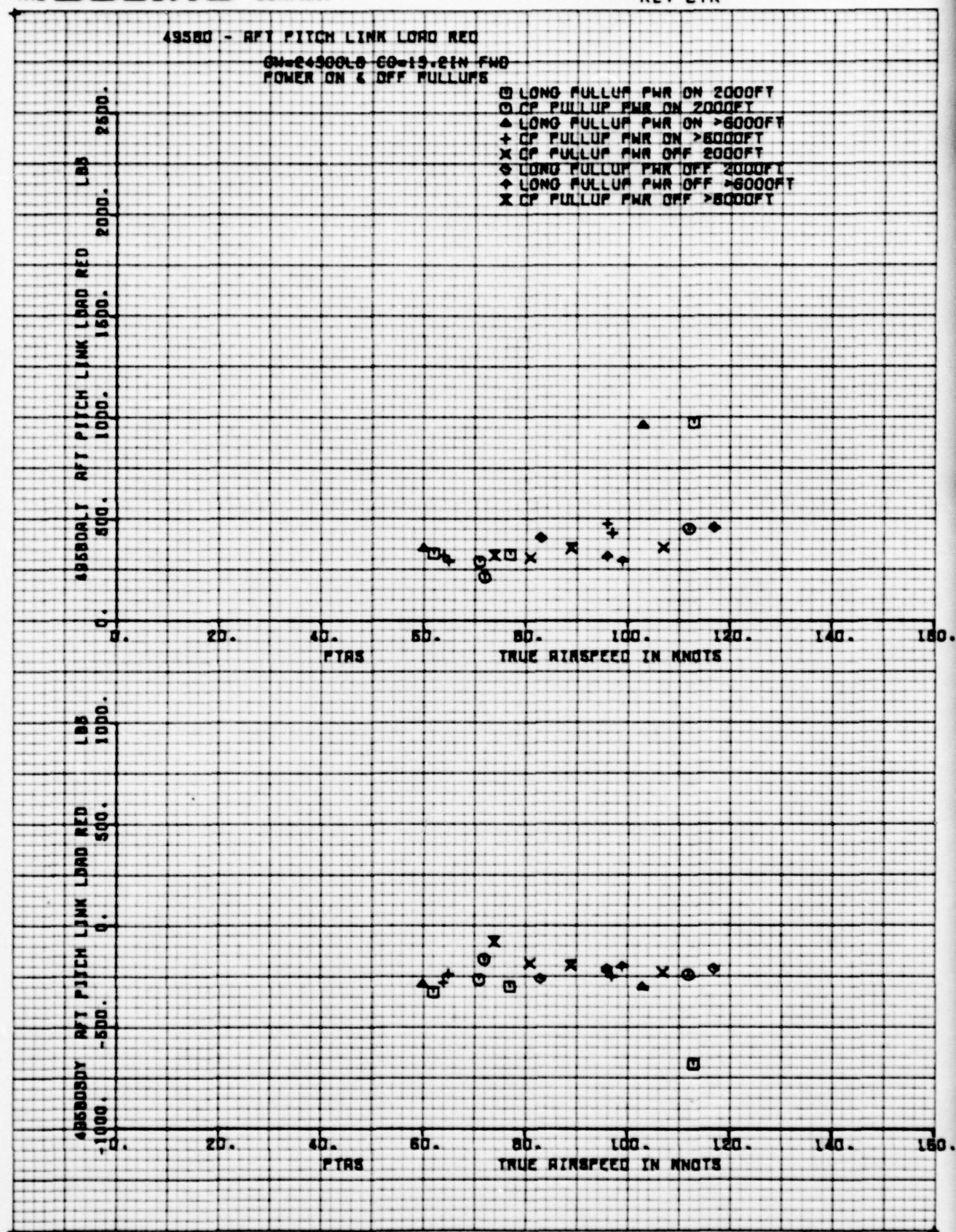


THE **BOEING** COMPANY

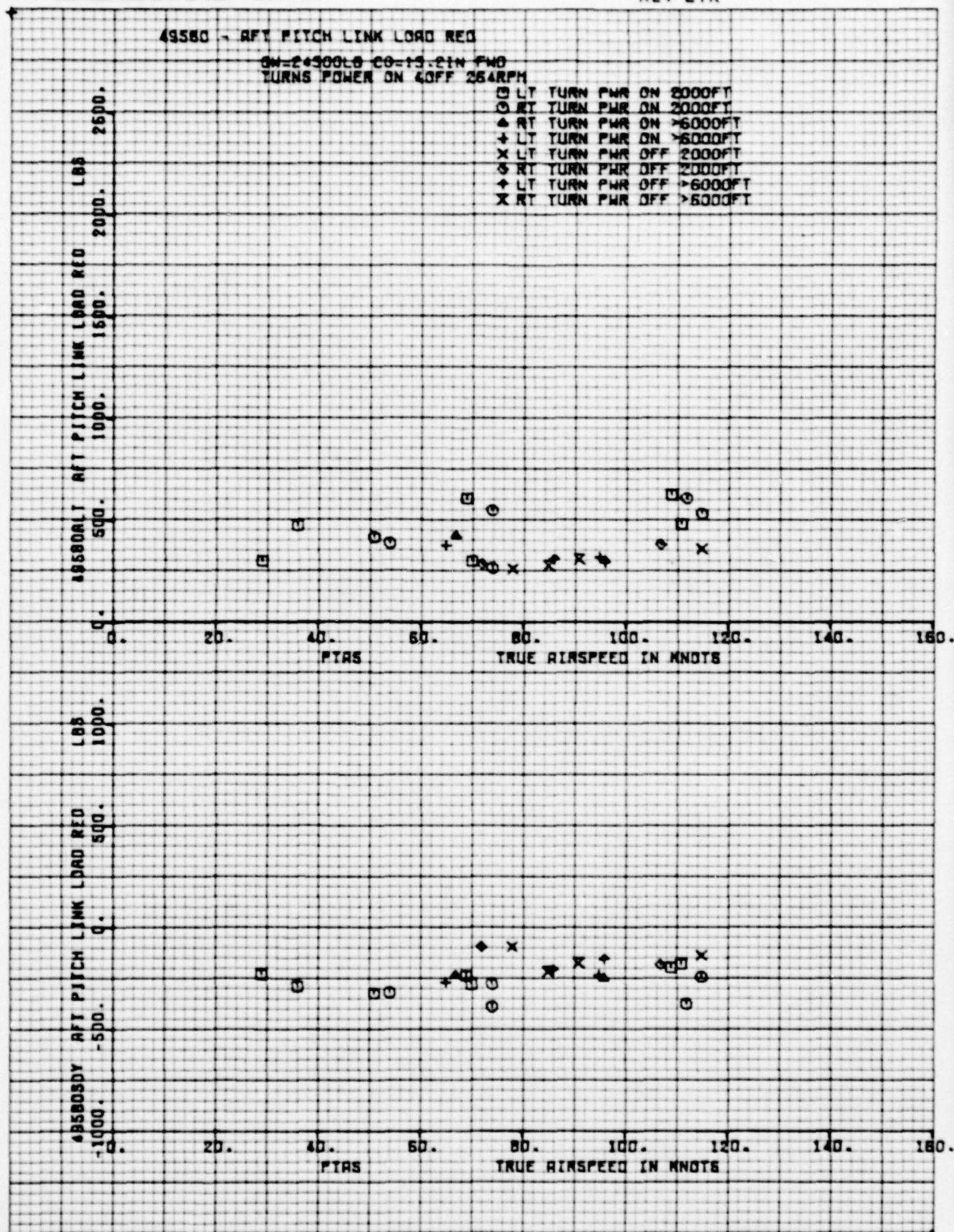
FORM 92300 (10/71)

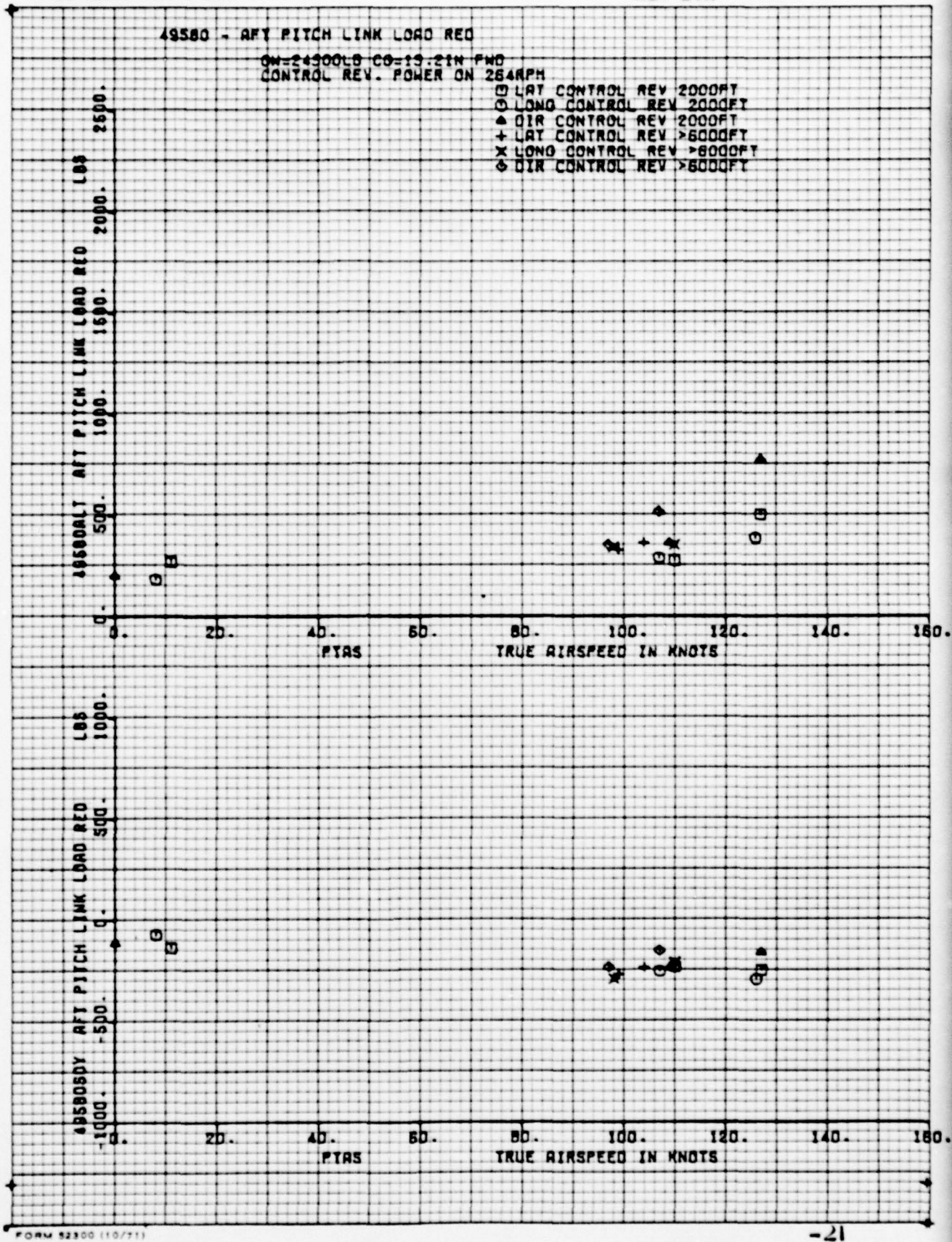
THE **BOEING** COMPANY

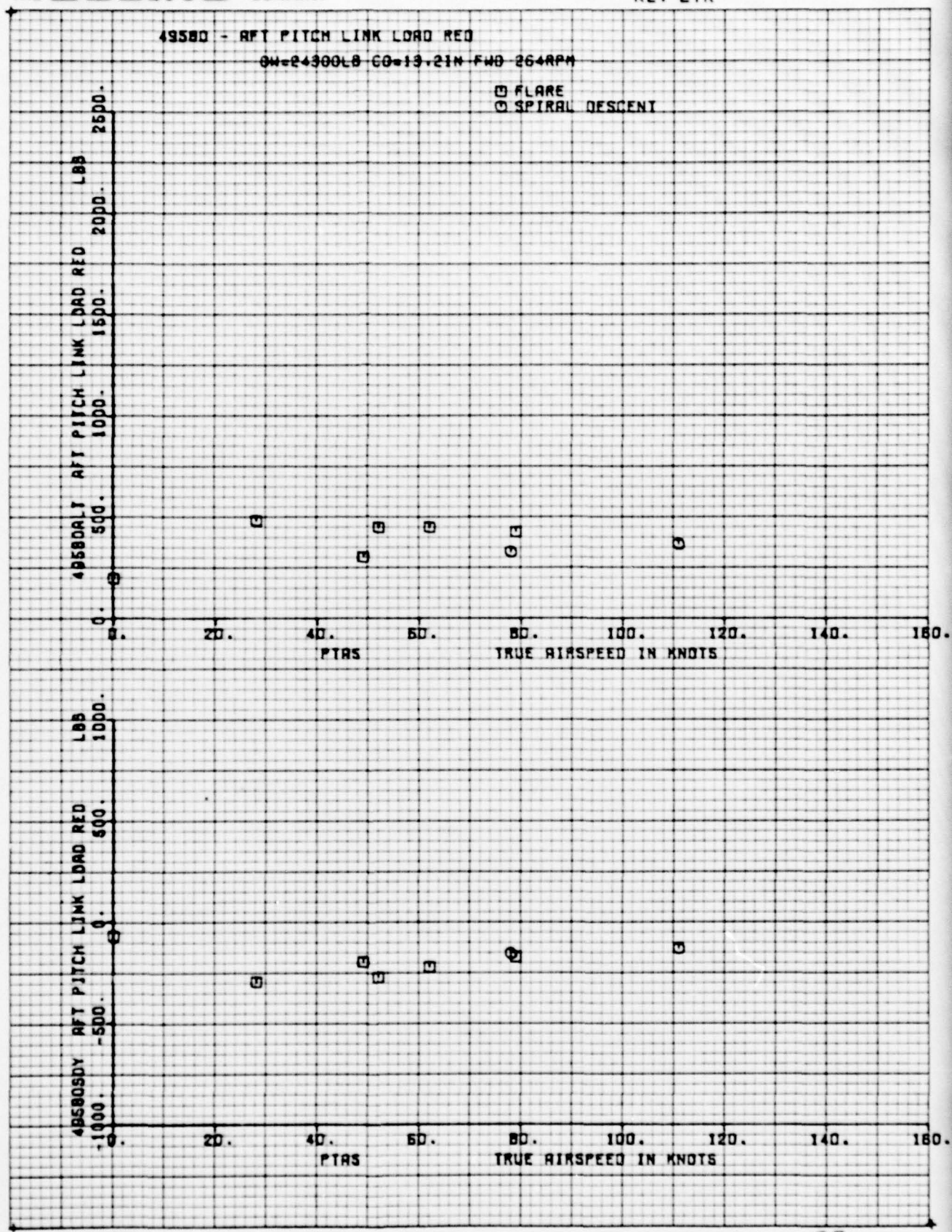
FORM 52300 (10/71)

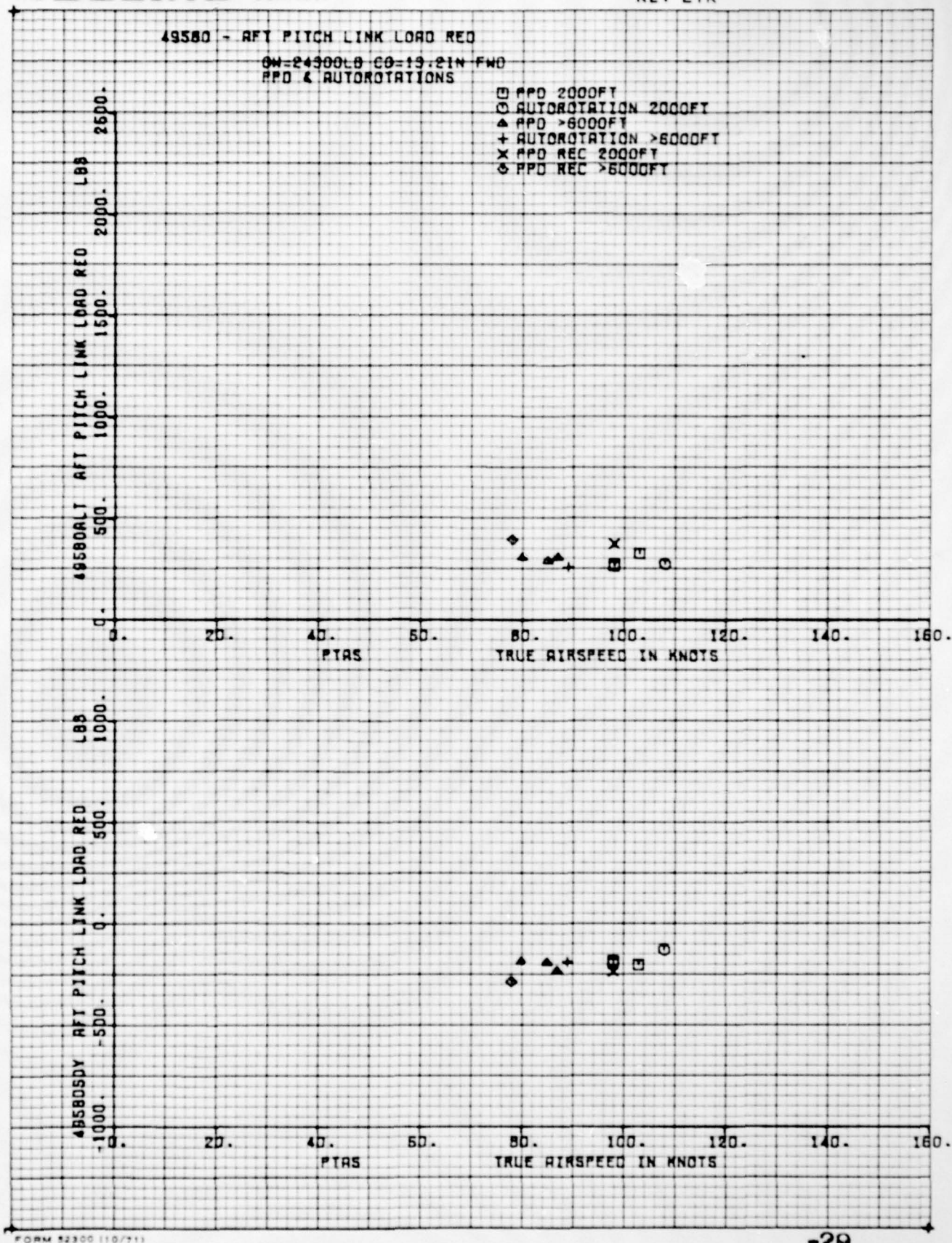
THE **BOEING** COMPANY

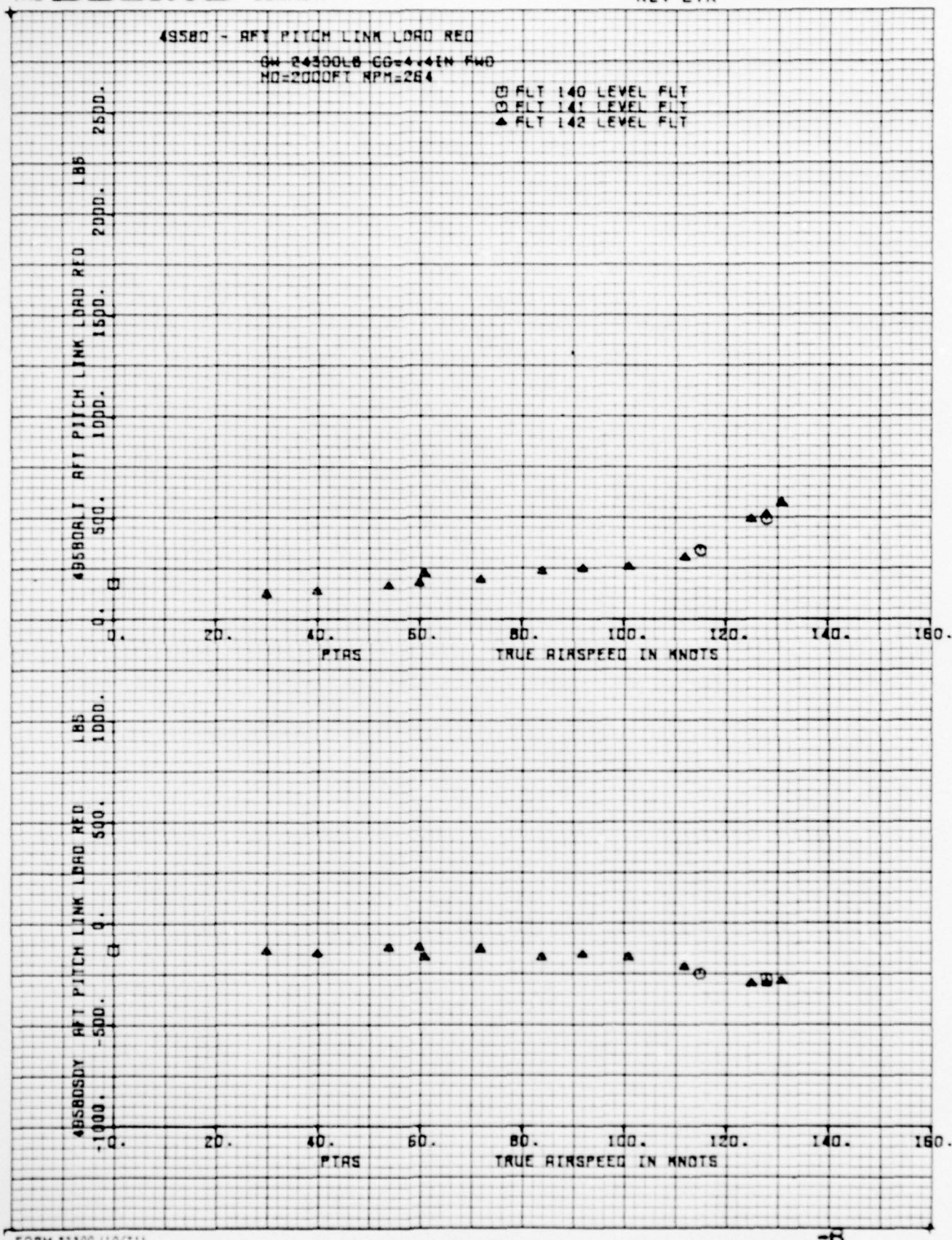
FORM 52300 (10/71)

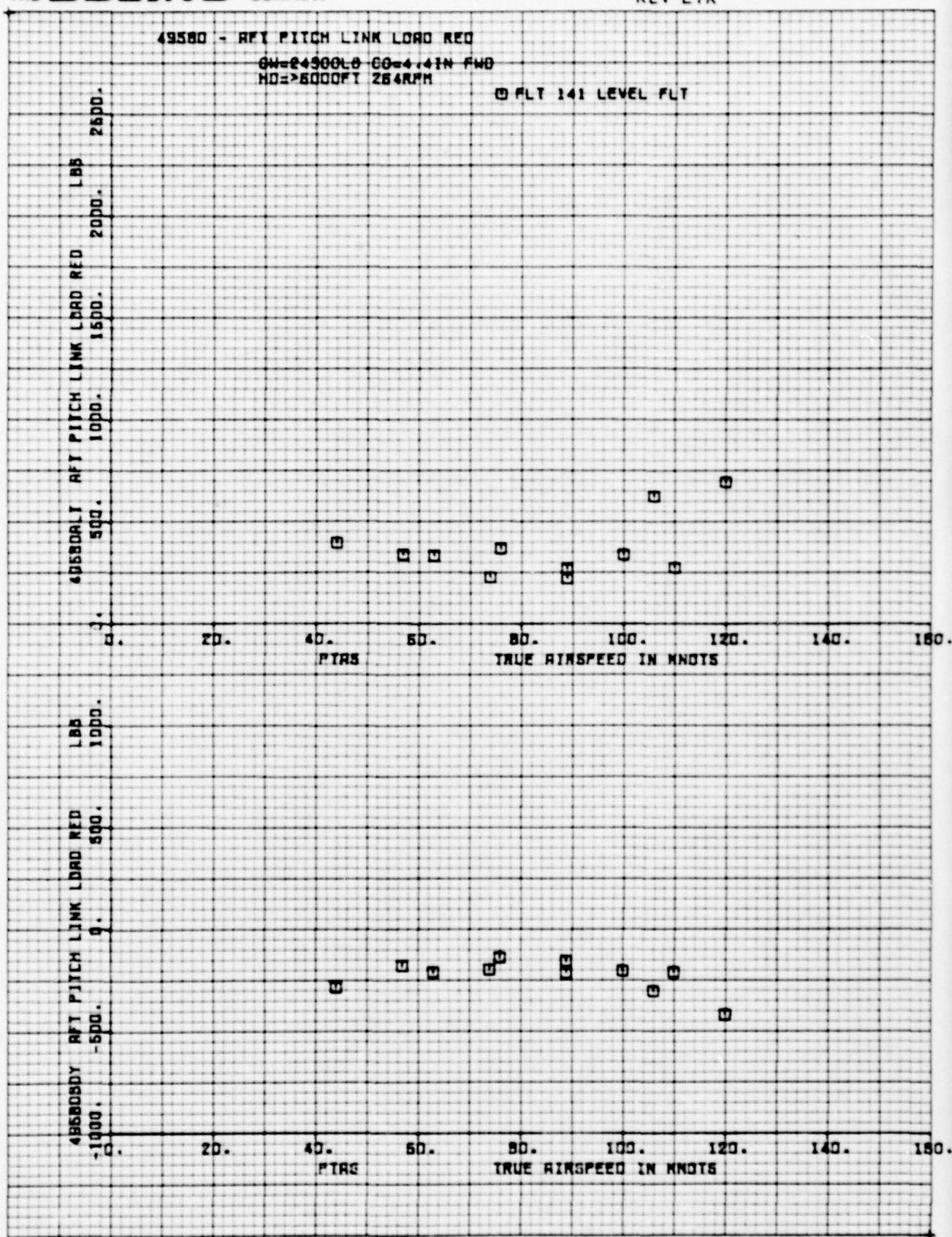
THE **BOEING** COMPANY



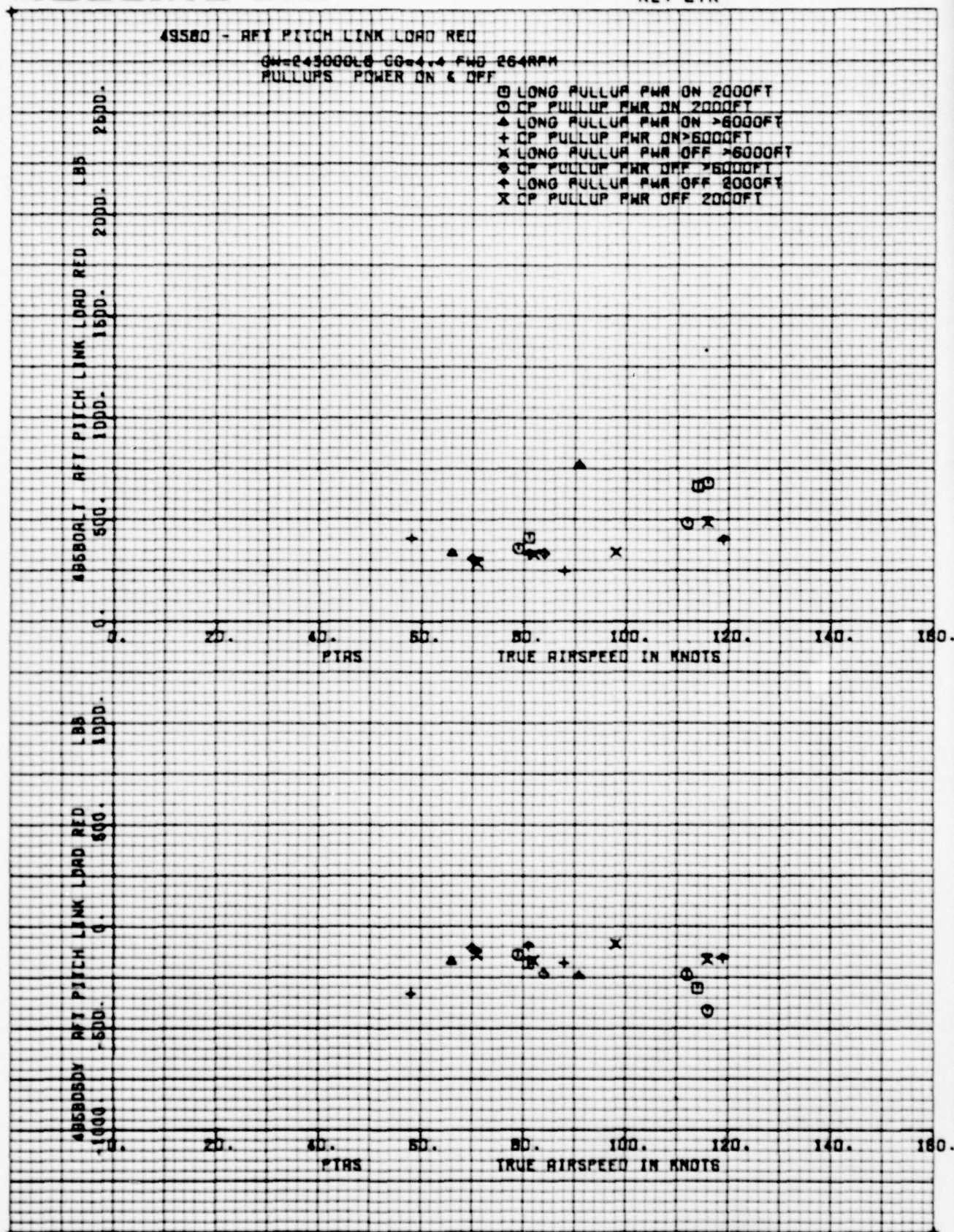






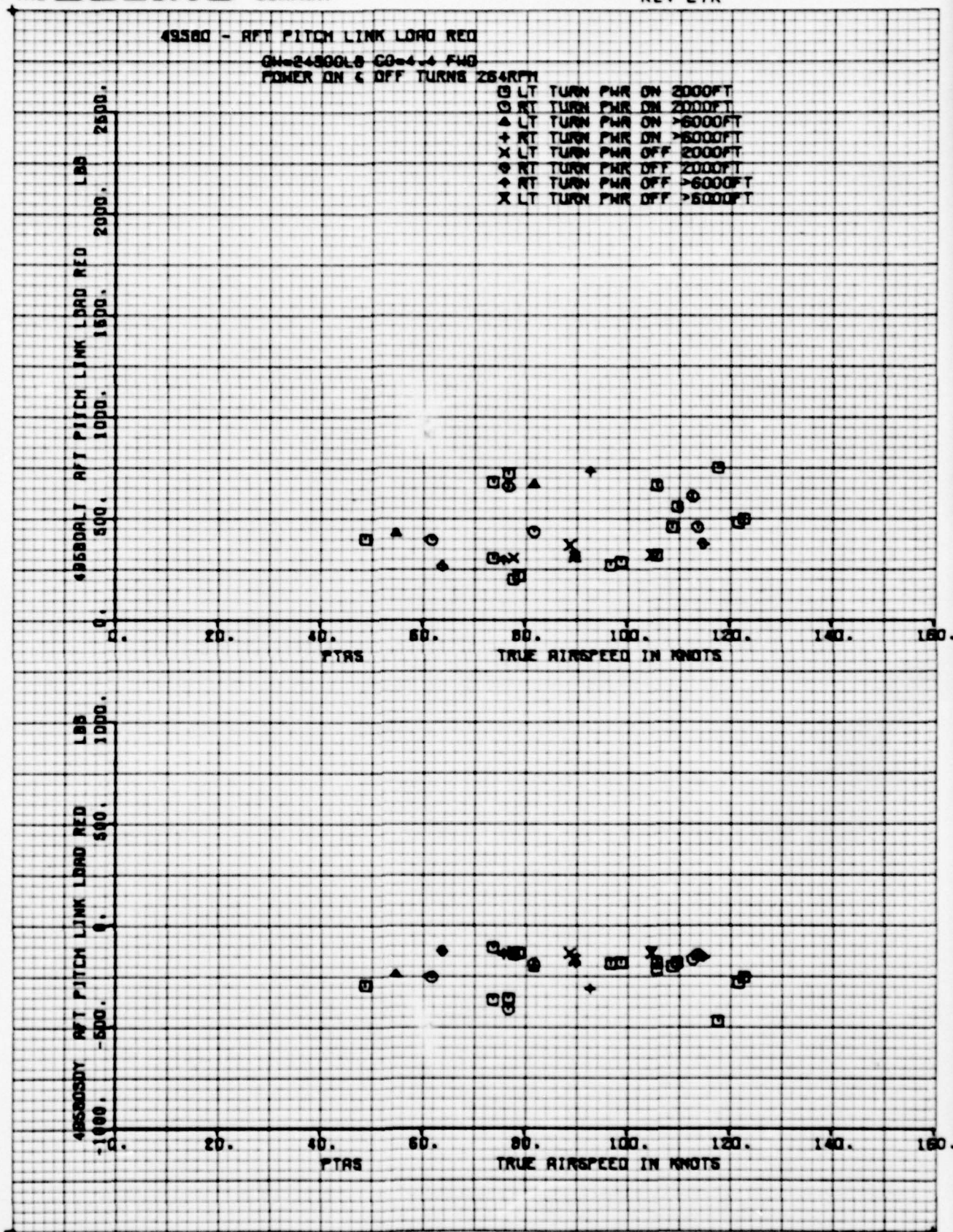


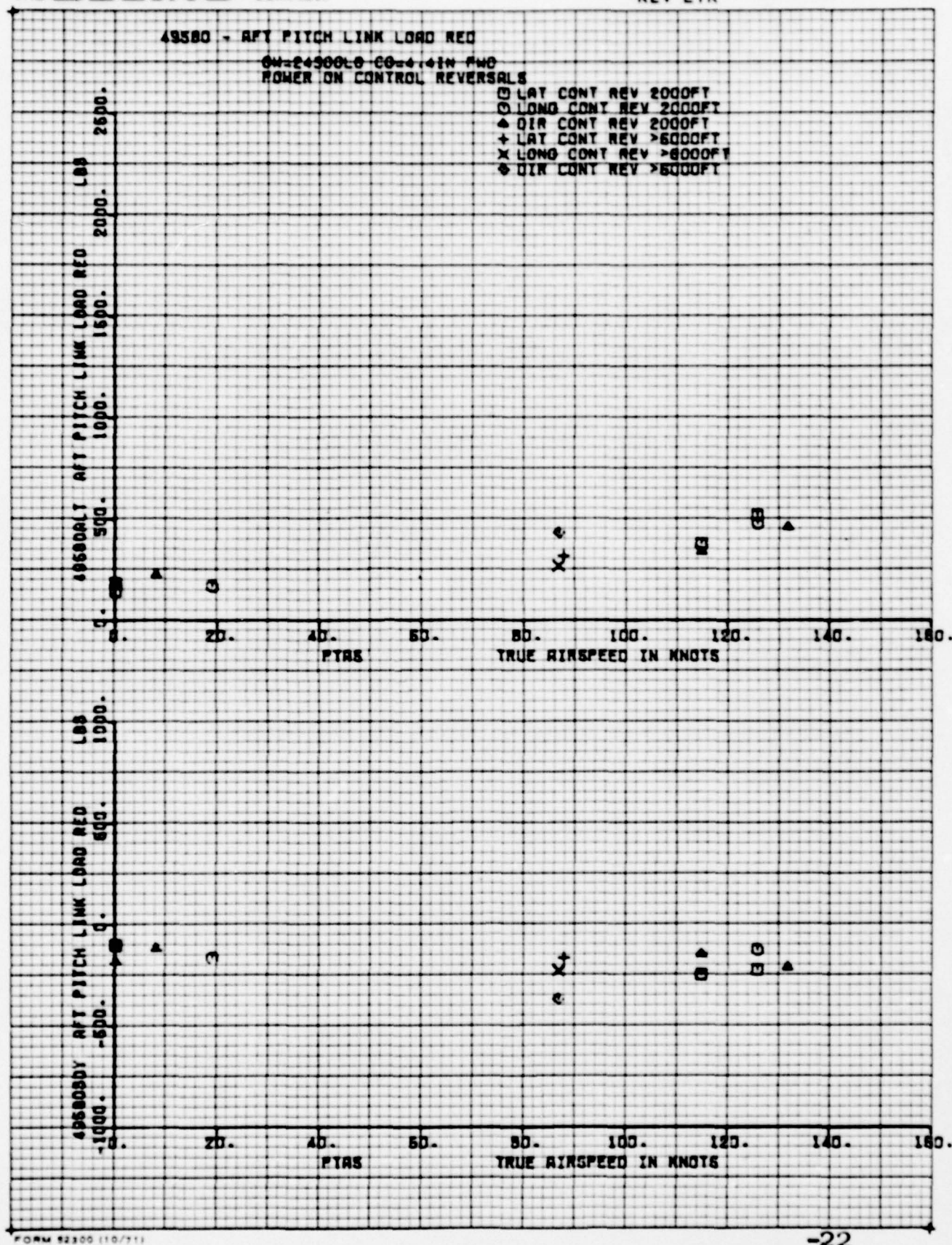
FORM 52300 (10/71)

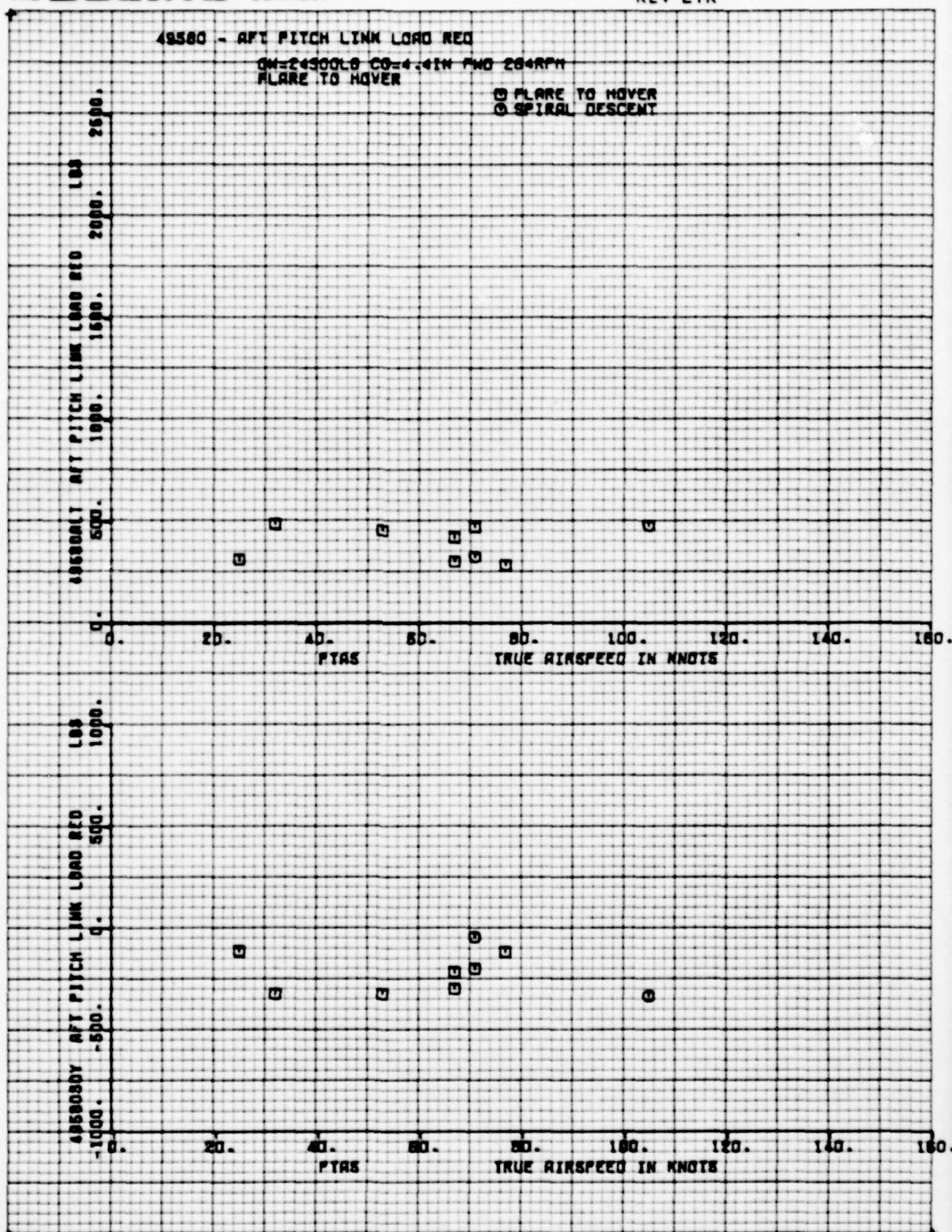
THE **BOEING** COMPANY

FORM 52300 (10/71)

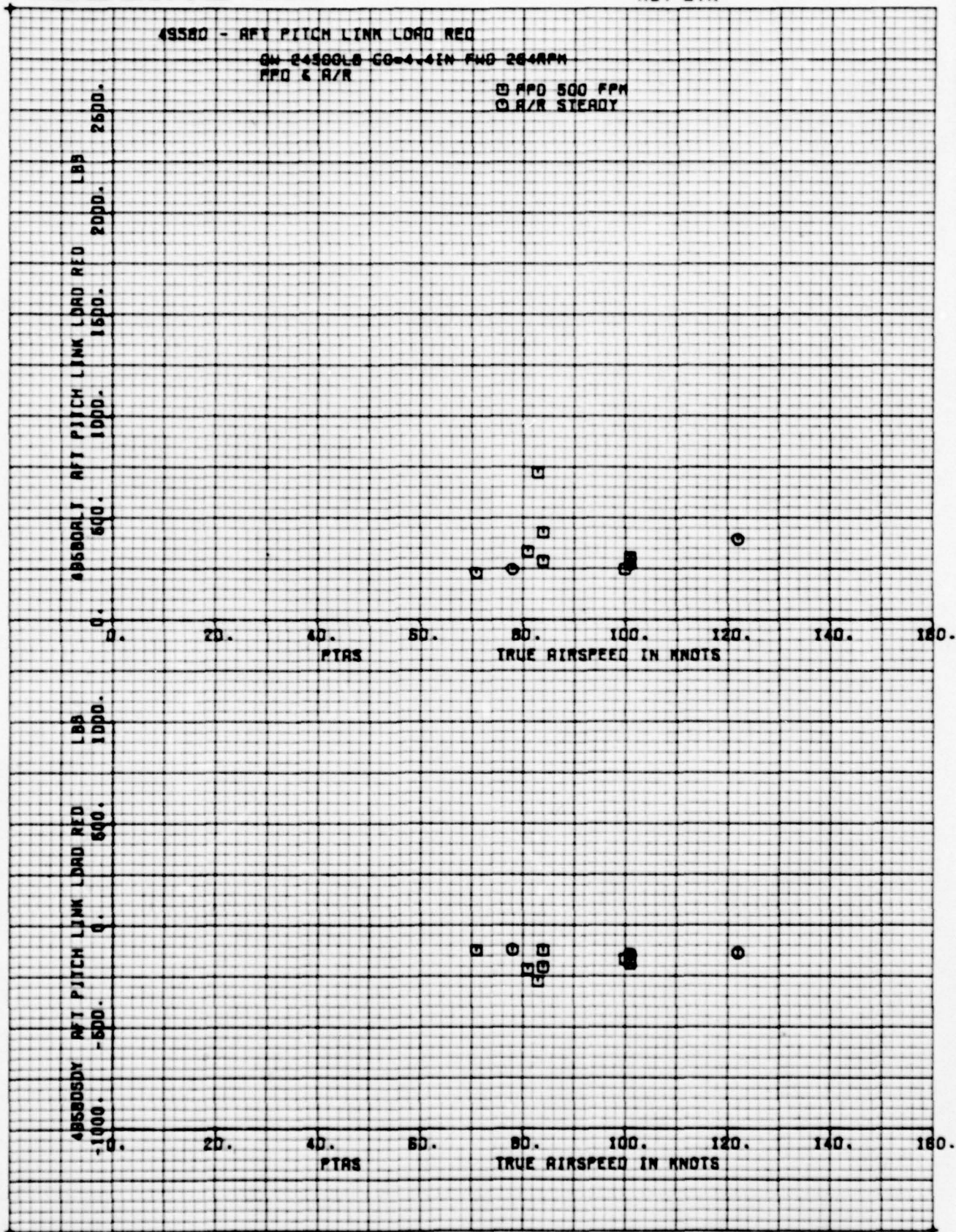
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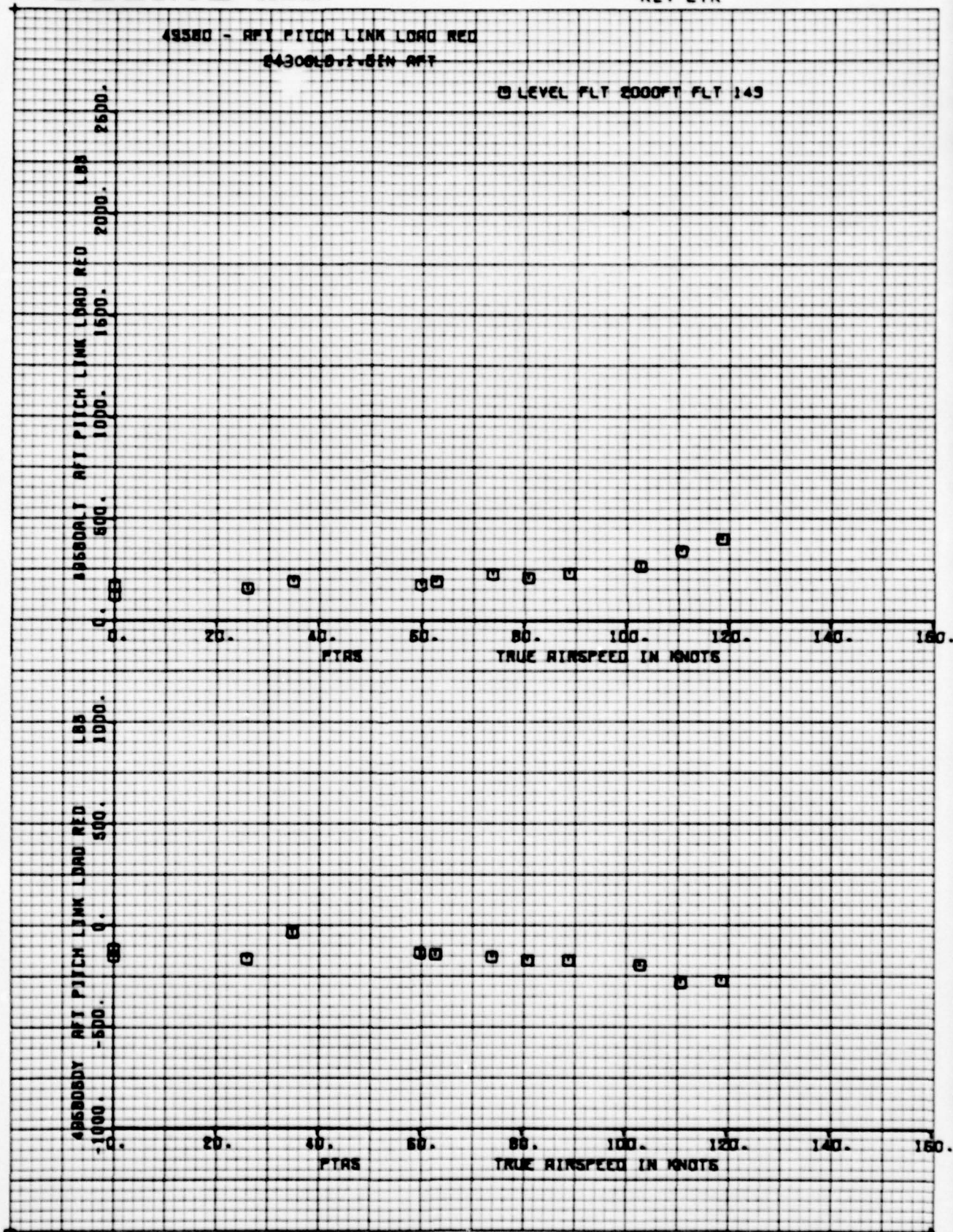






ORW 52300 (10/71)





THE **BOEING** COMPANY

PREPARED BY: J. Bendo

CHECKED BY:

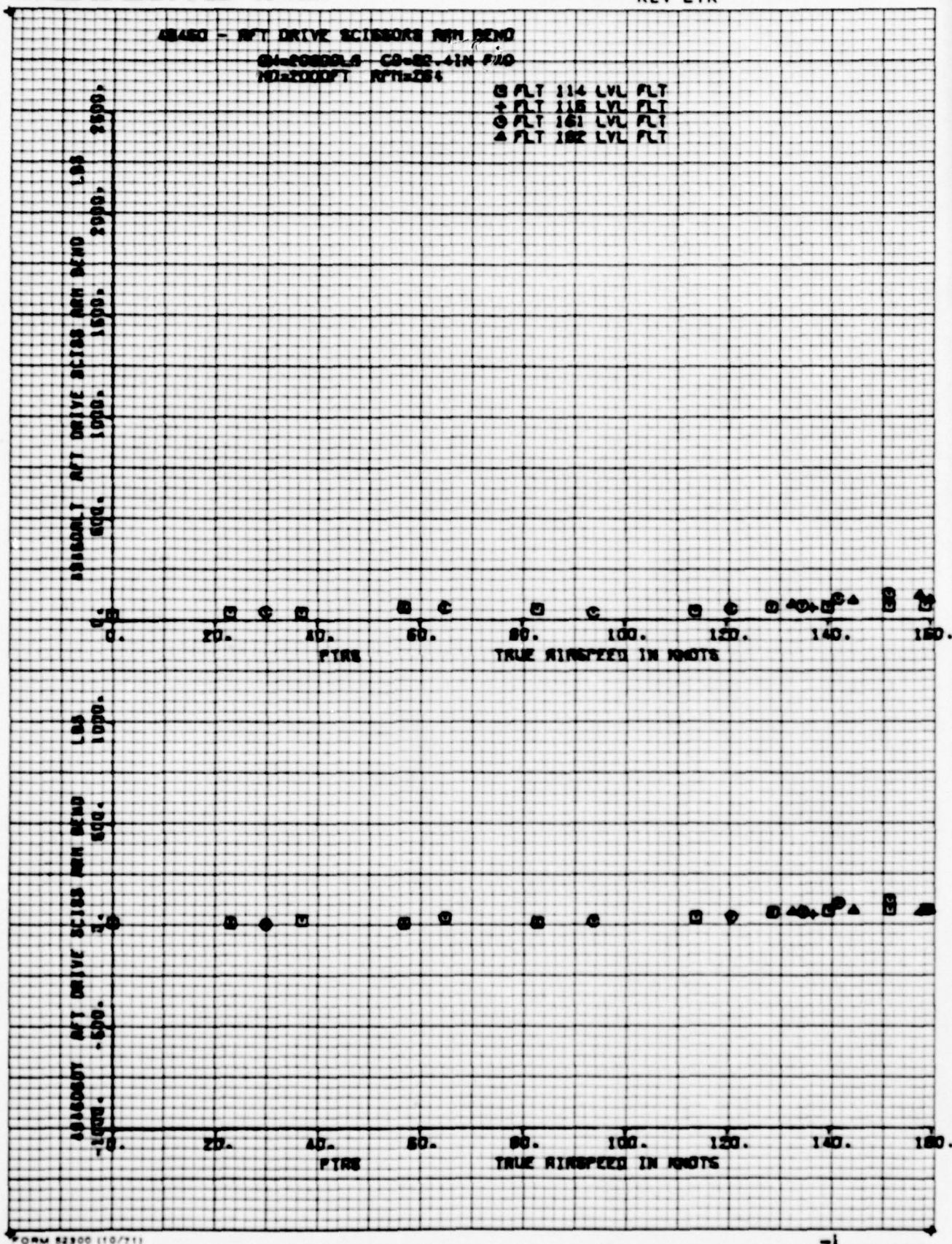
DATE: 8/28/78

NUMBER D210-11168-3

REV LTR Volume 7

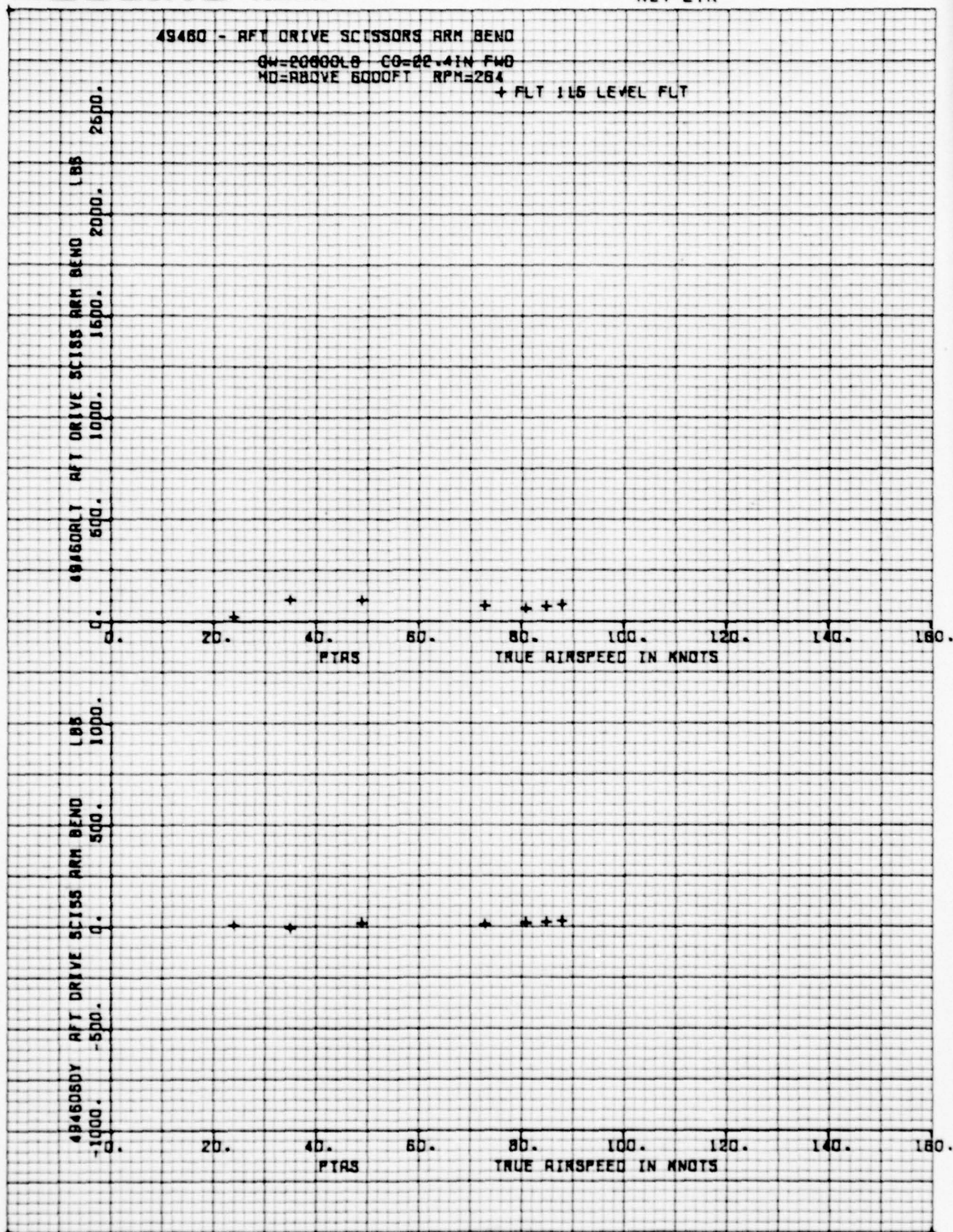
MODEL NO.

4.4 Aft Drive Scissors Arm

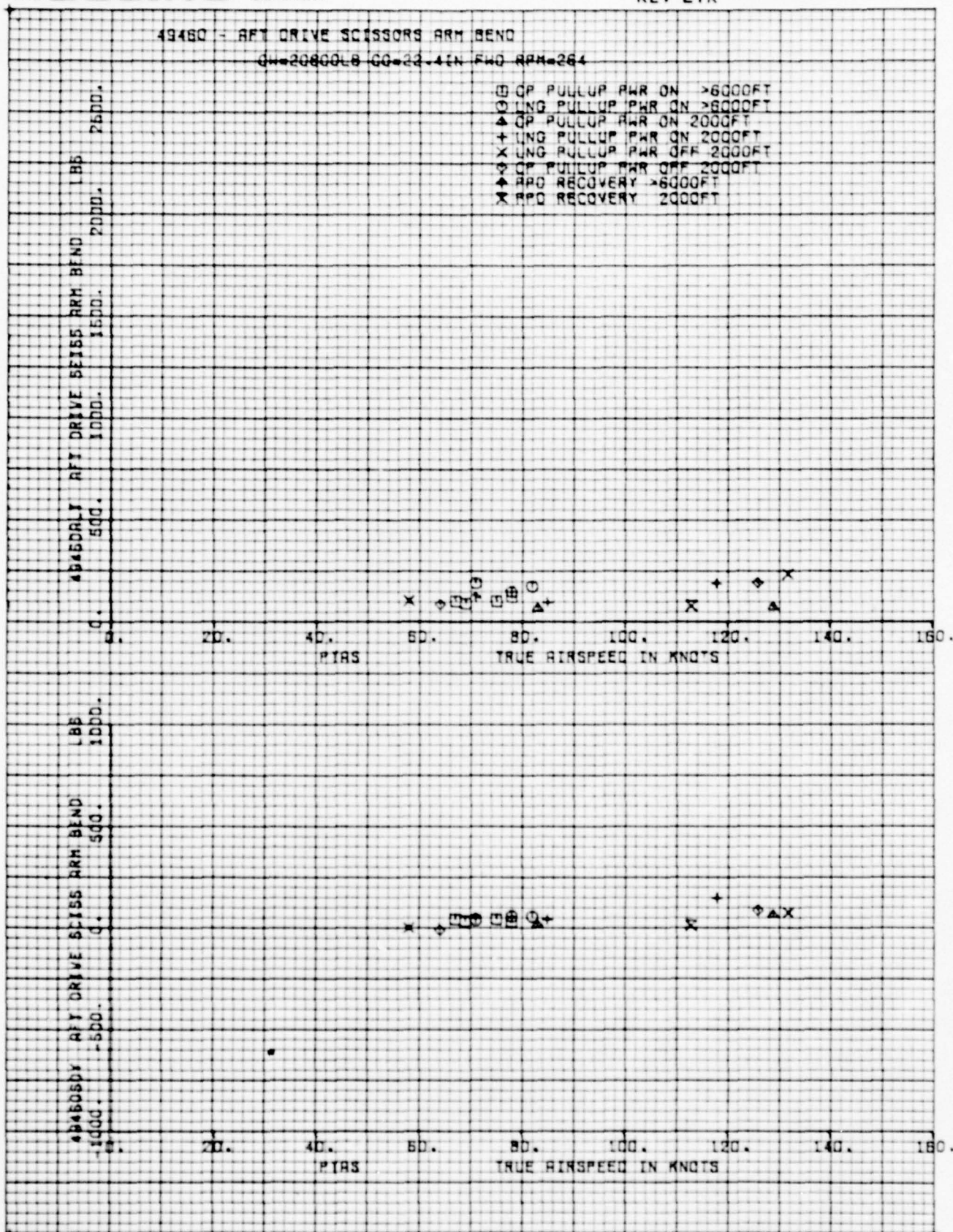


FORM 8280 (10/71)

THE **BOEING** COMPANY



FORM 82300 (10/71)

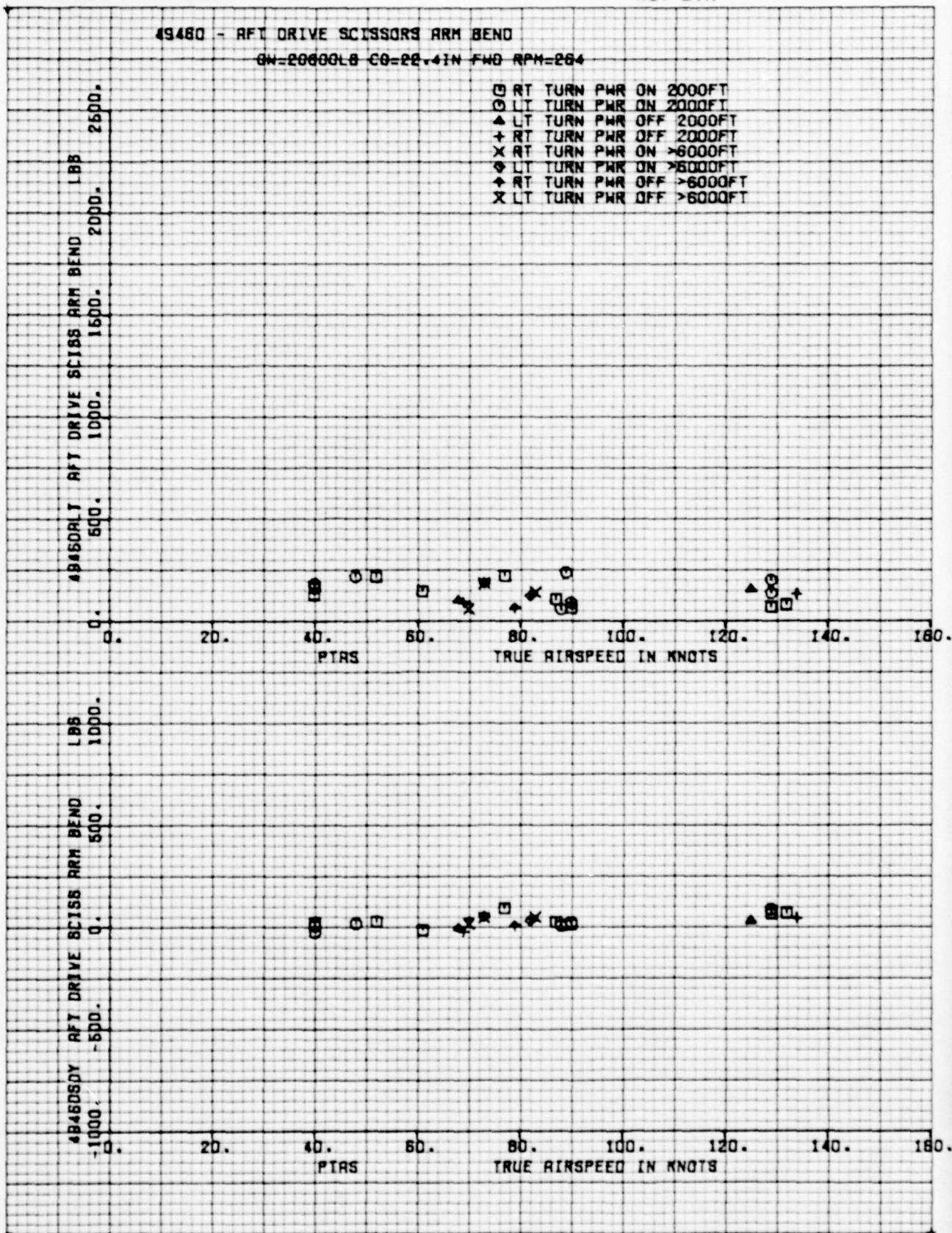


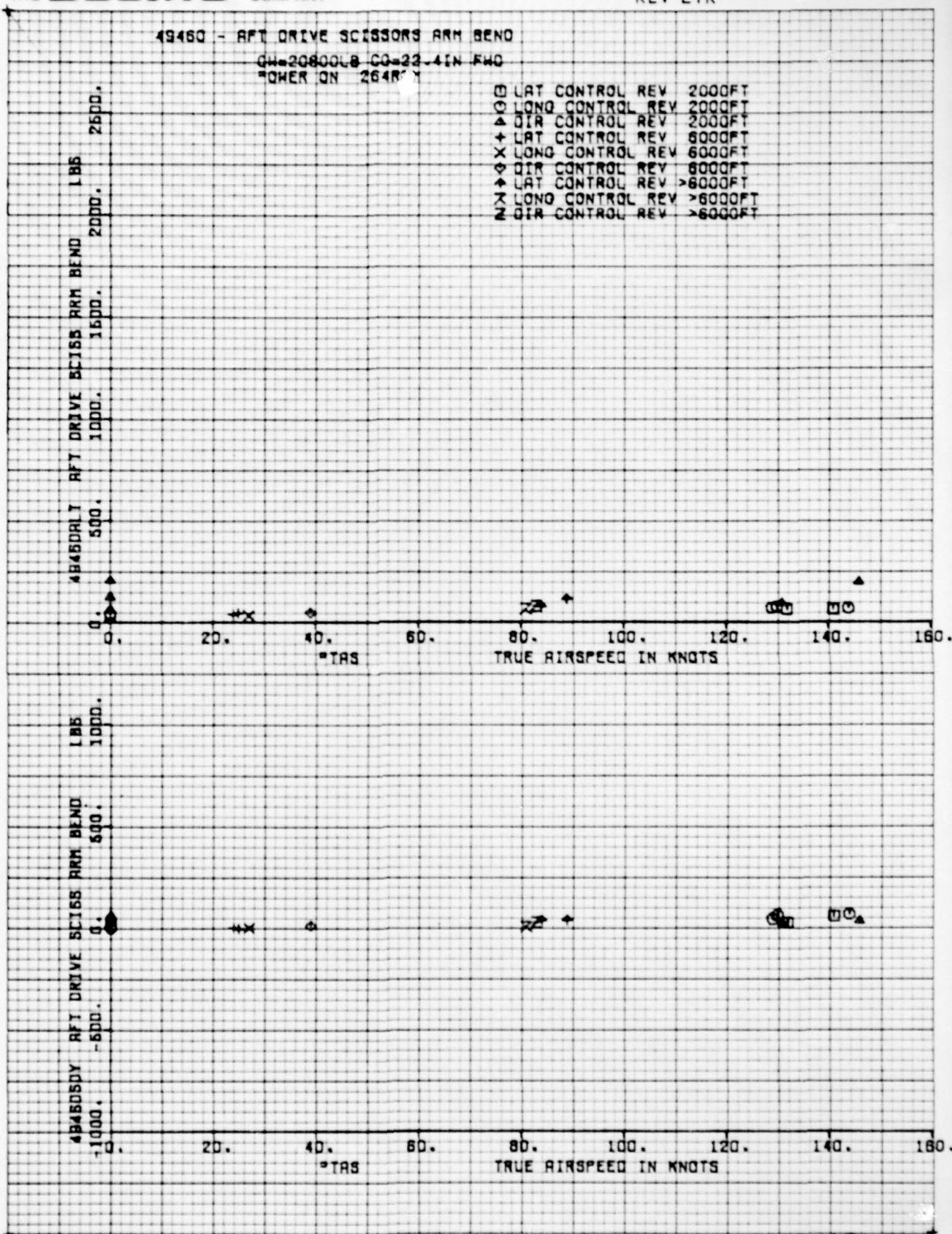
FORM 52100 (10/71)

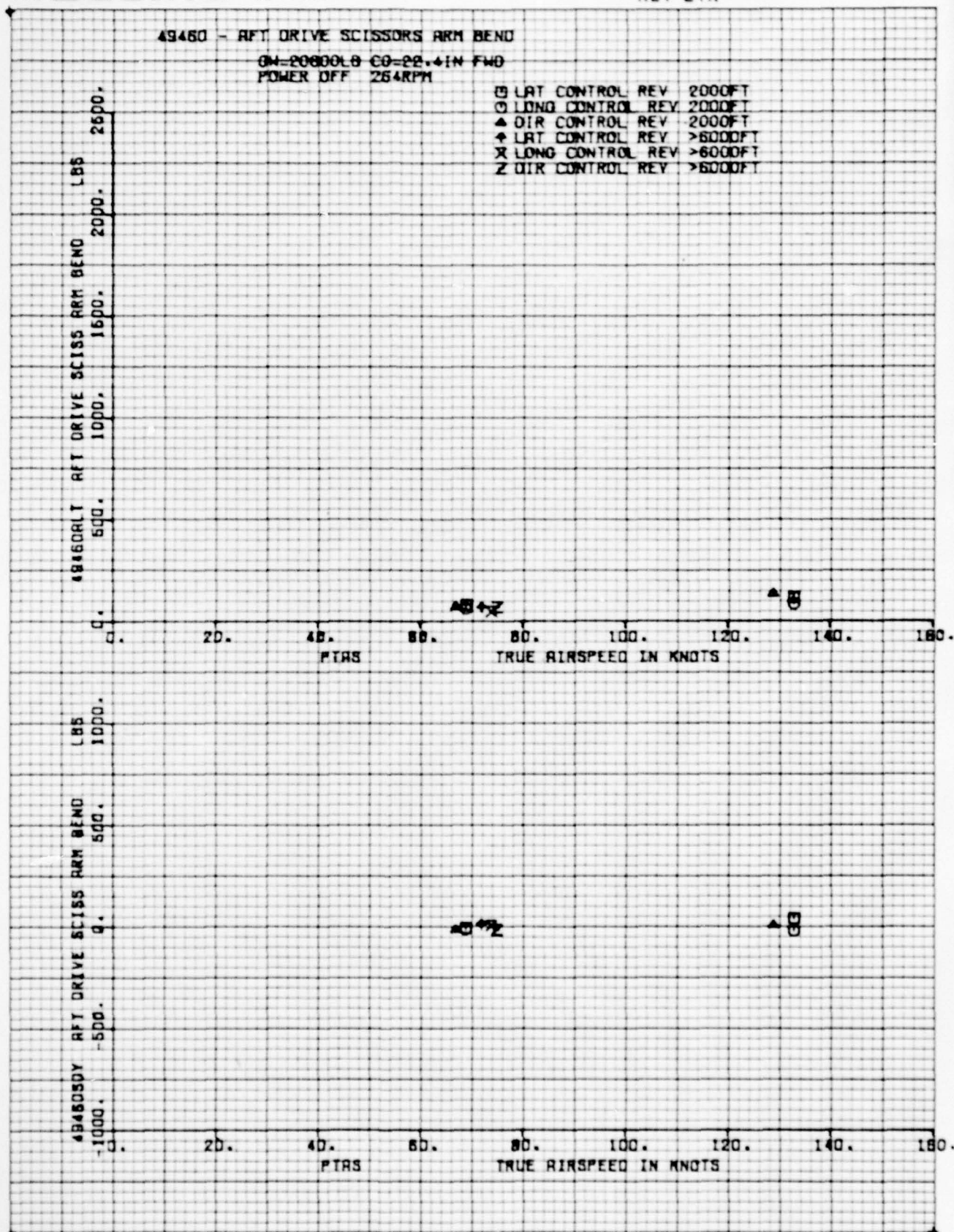
49480 - AFT DRIVE SCISSORS ARM BEND

GW=20000LB CG=22.4IN FWD RPM=264

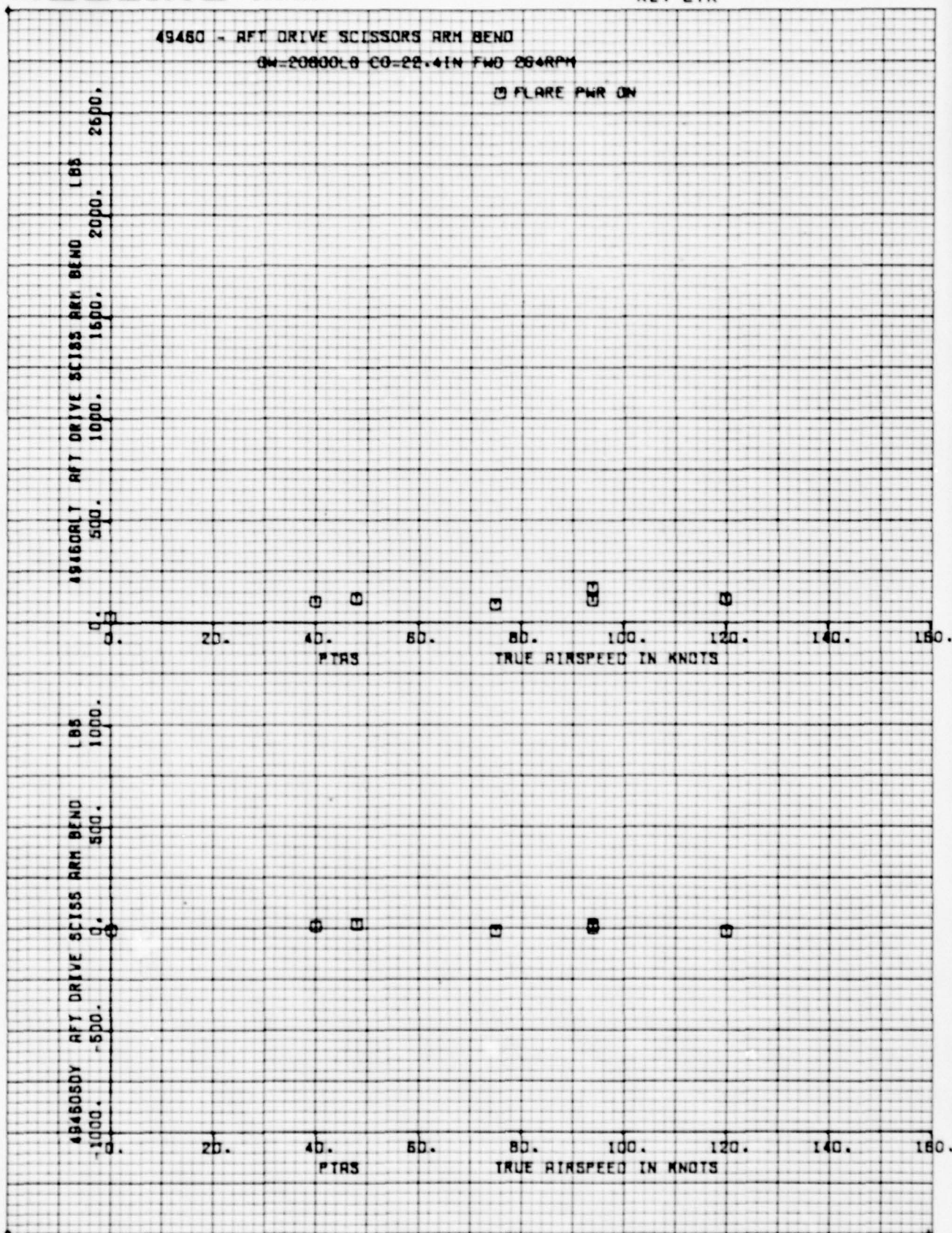
- RT TURN PWR ON 2000FT
- LT TURN PWR ON 2000FT
- ▲ LT TURN PWR OFF 2000FT
- + RT TURN PWR OFF 2000FT
- x RT TURN PWR ON >6000FT
- ◇ LT TURN PWR ON >6000FT
- ◆ RT TURN PWR OFF >6000FT
- x LT TURN PWR OFF >6000FT





THE **BOEING** COMPANY

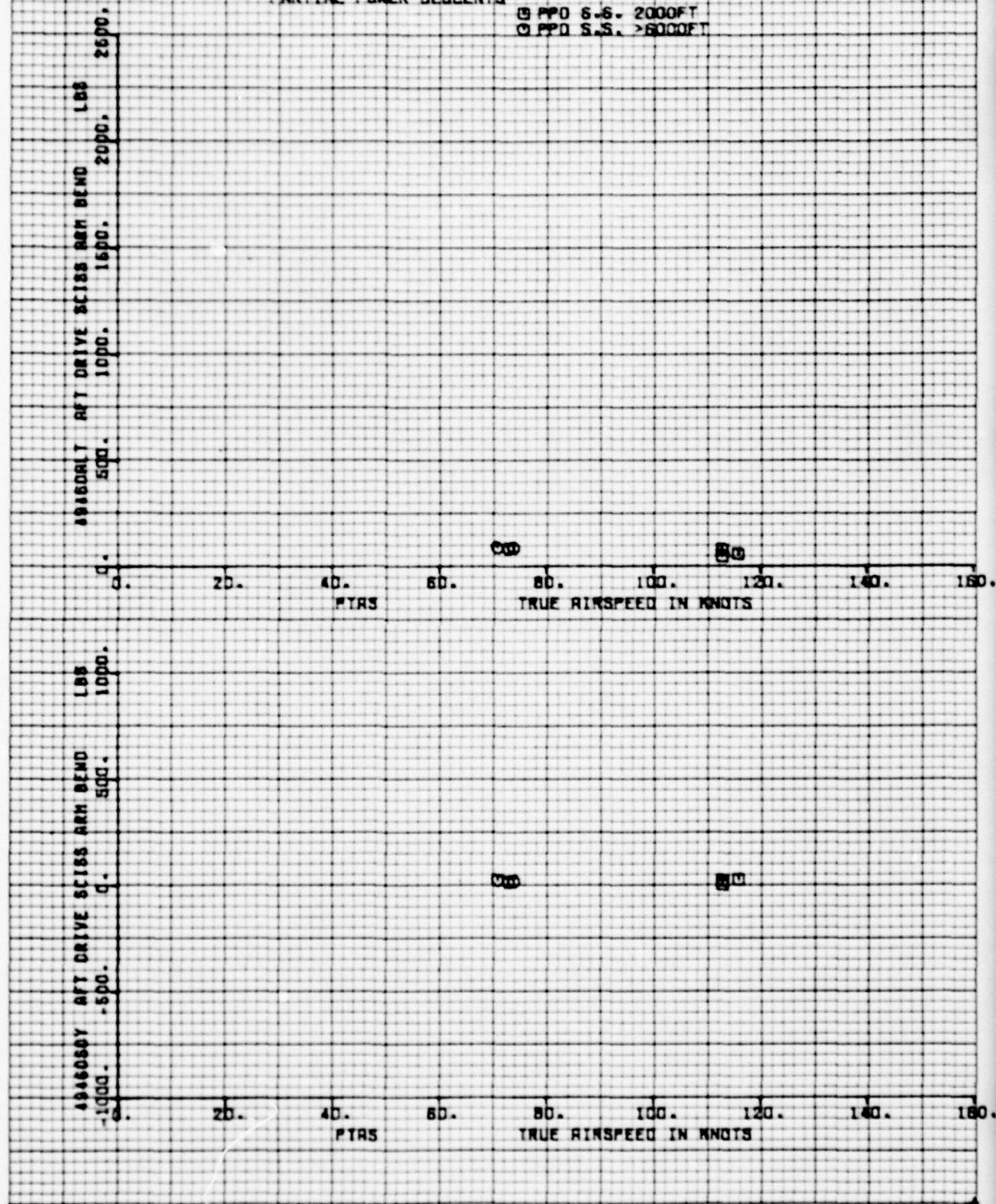
FORM 52300 (10/71)



49460 - AFT DRIVE SCISSORS ARM BEND

GM-20800LB CG-22.4IN FWD
PARTIAL POWER DESCENTS

③ PPD 6-6. 2000FT
④ PPD 5-5. >6000FT



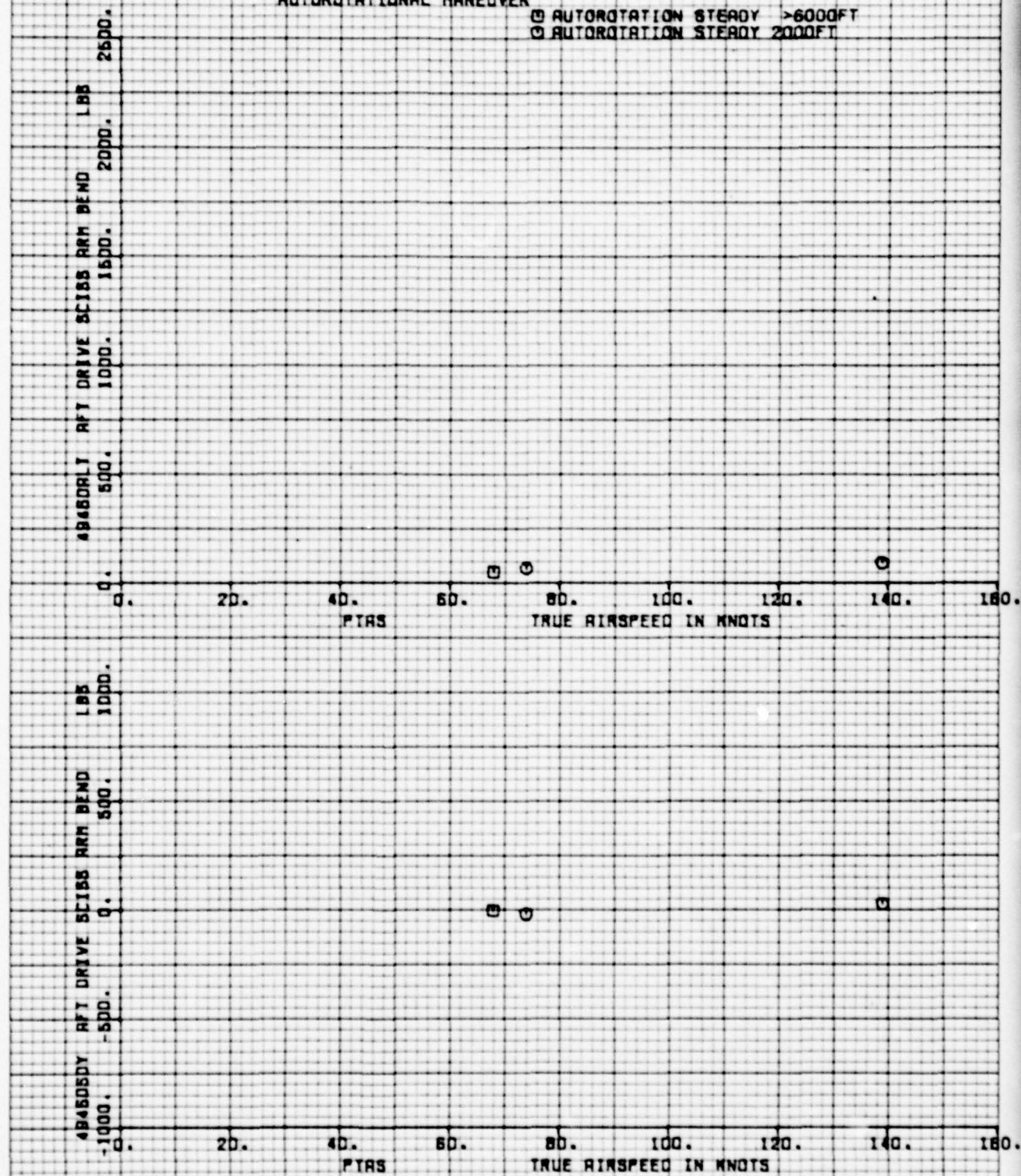
FORM 52300 (10/71)

THE **BOEING** COMPANY

49480 - AFT DRIVE SCISSORS ARM BEND

GW=20800LB CG=22.4IN FWD
AUTOROTATIONAL MANEUVER

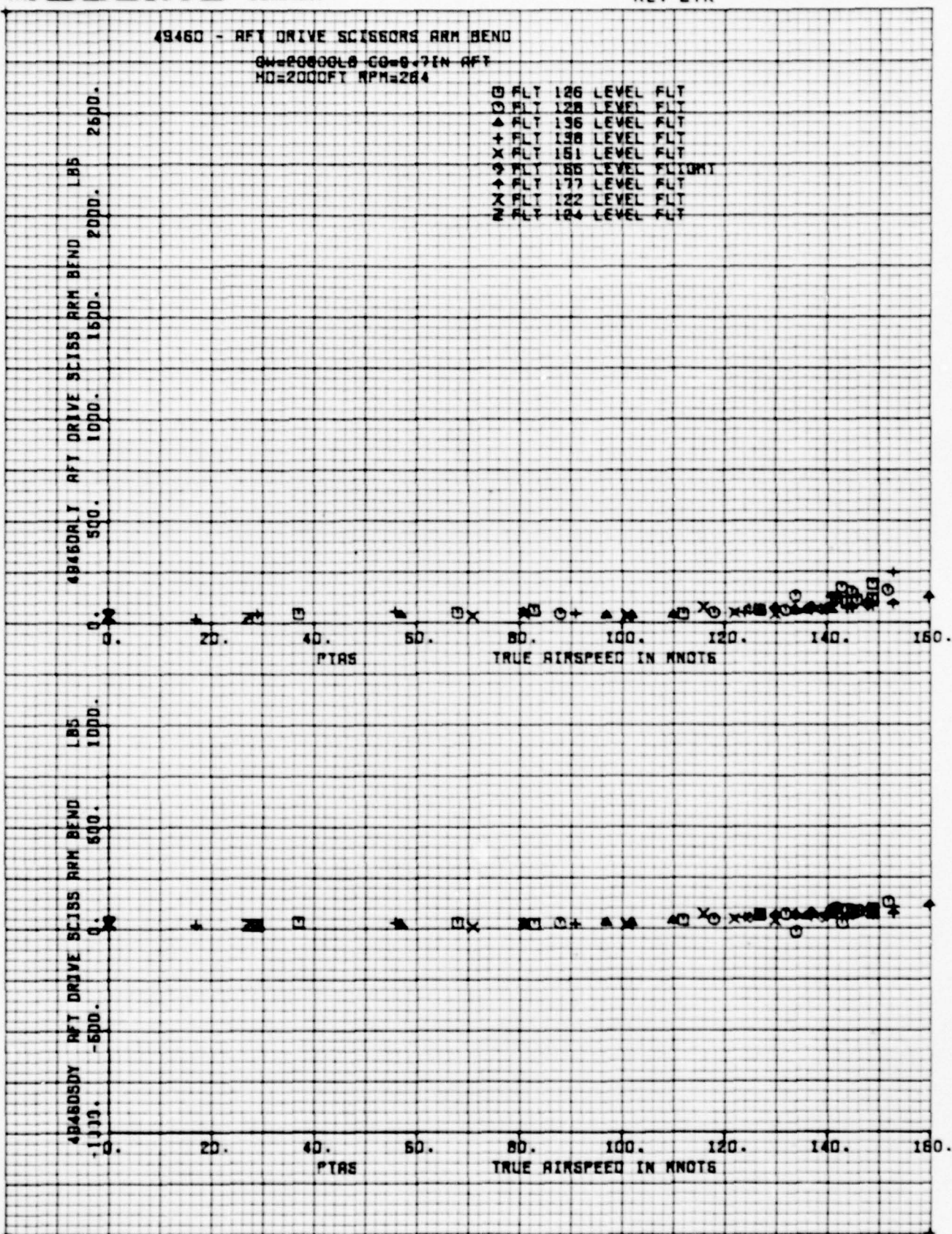
○ AUTOROTATION STEADY >6000FT
 ○ AUTOROTATION STEADY 2000FT

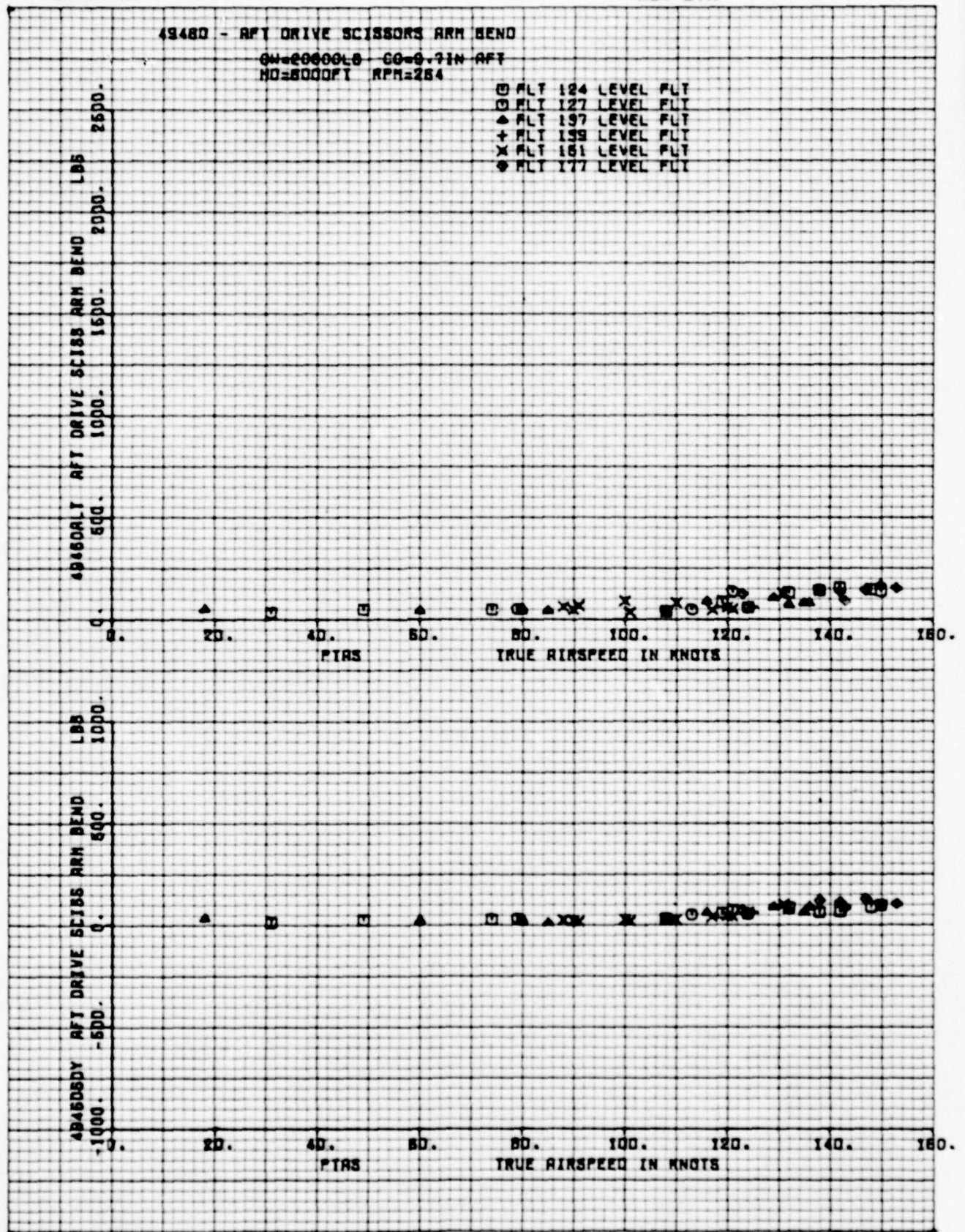


49460 - RFT DRIVE SCISSORS ARM BEND

GW=20000LB GO=0.7IN RFT
HD=2000FT RPM=284

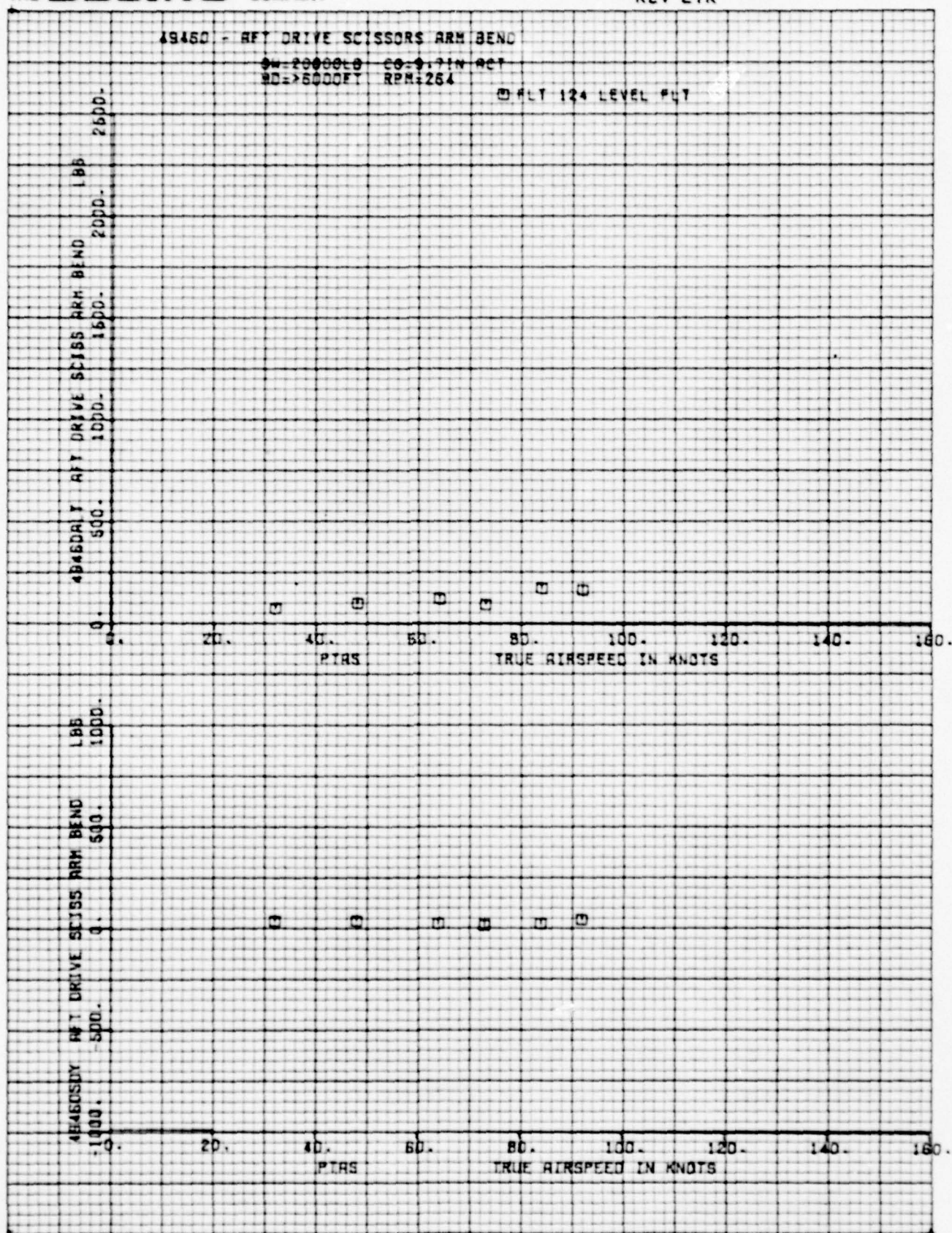
□ FLT 126 LEVEL FLT
○ FLT 128 LEVEL FLT
△ FLT 136 LEVEL FLT
+ FLT 138 LEVEL FLT
x FLT 151 LEVEL FLT
9 FLT 185 LEVEL FLIGHT
+ FLT 177 LEVEL FLT
x FLT 122 LEVEL FLT
z FLT 124 LEVEL FLT



THE **BOEING** COMPANY

FORM 52300 (10/71)

-4

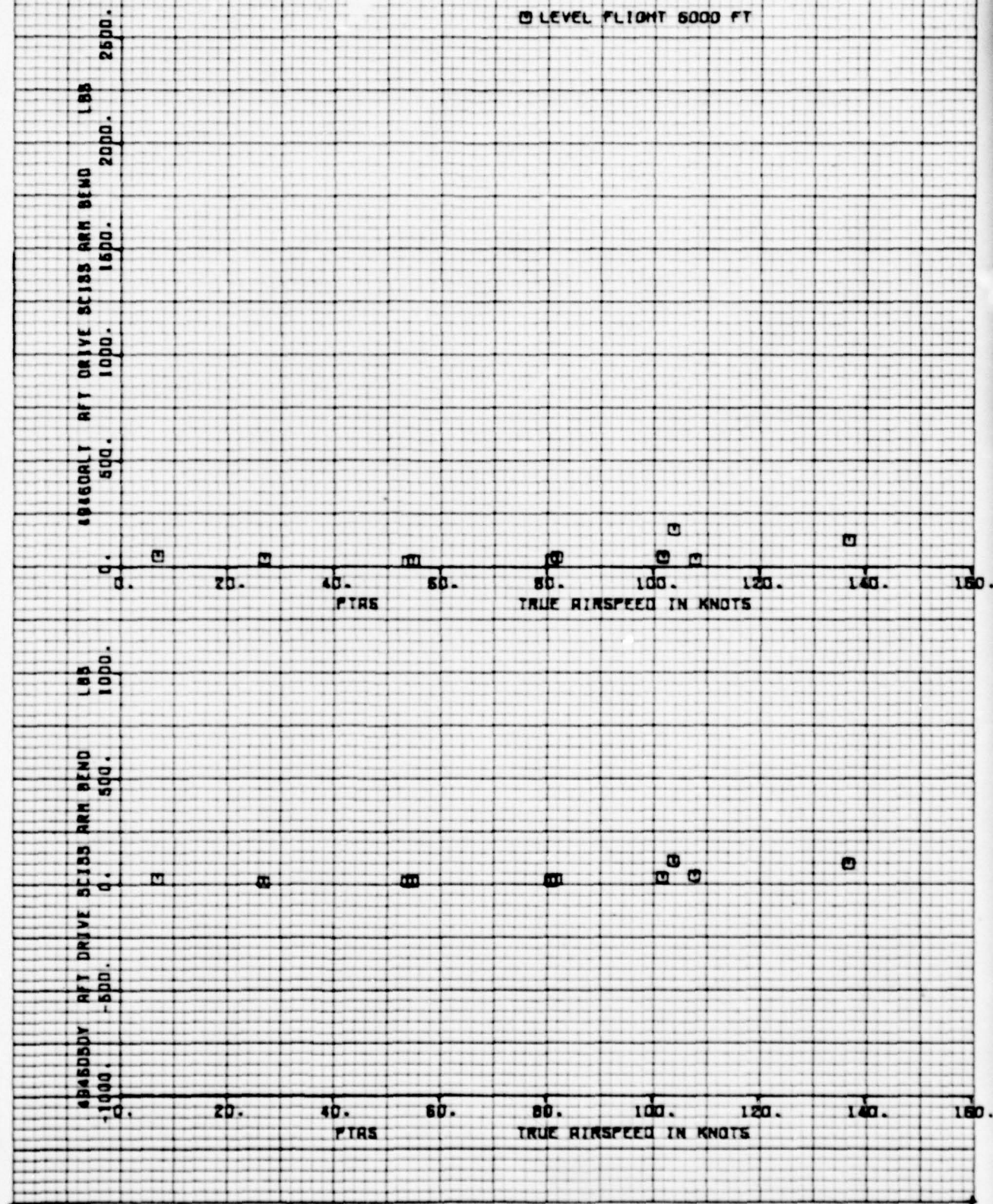


THE **BOEING** COMPANY

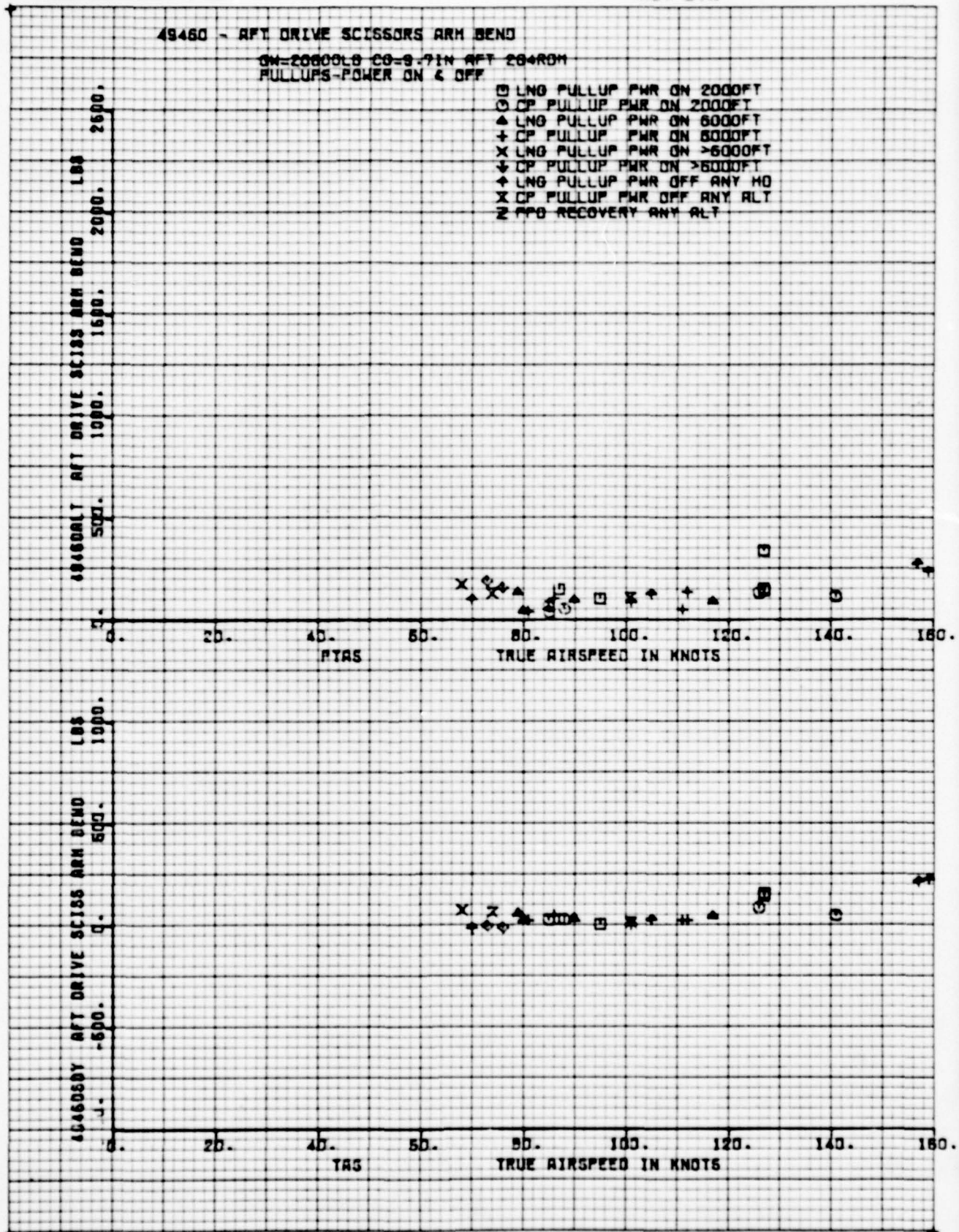
49460 - AFT DRIVE SCISSORS ARM BEND

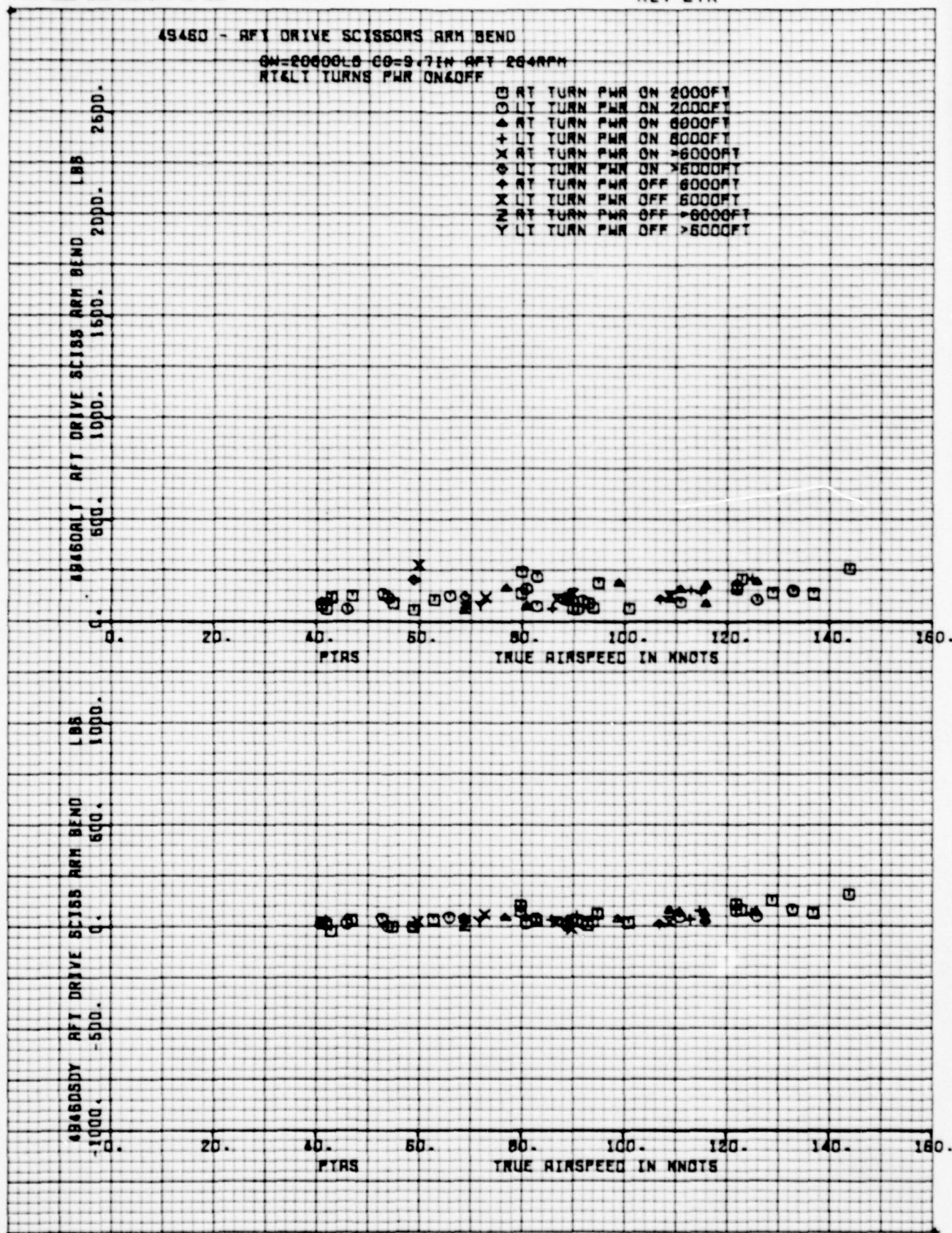
20000LB 9.7EN AFT 240 RPM

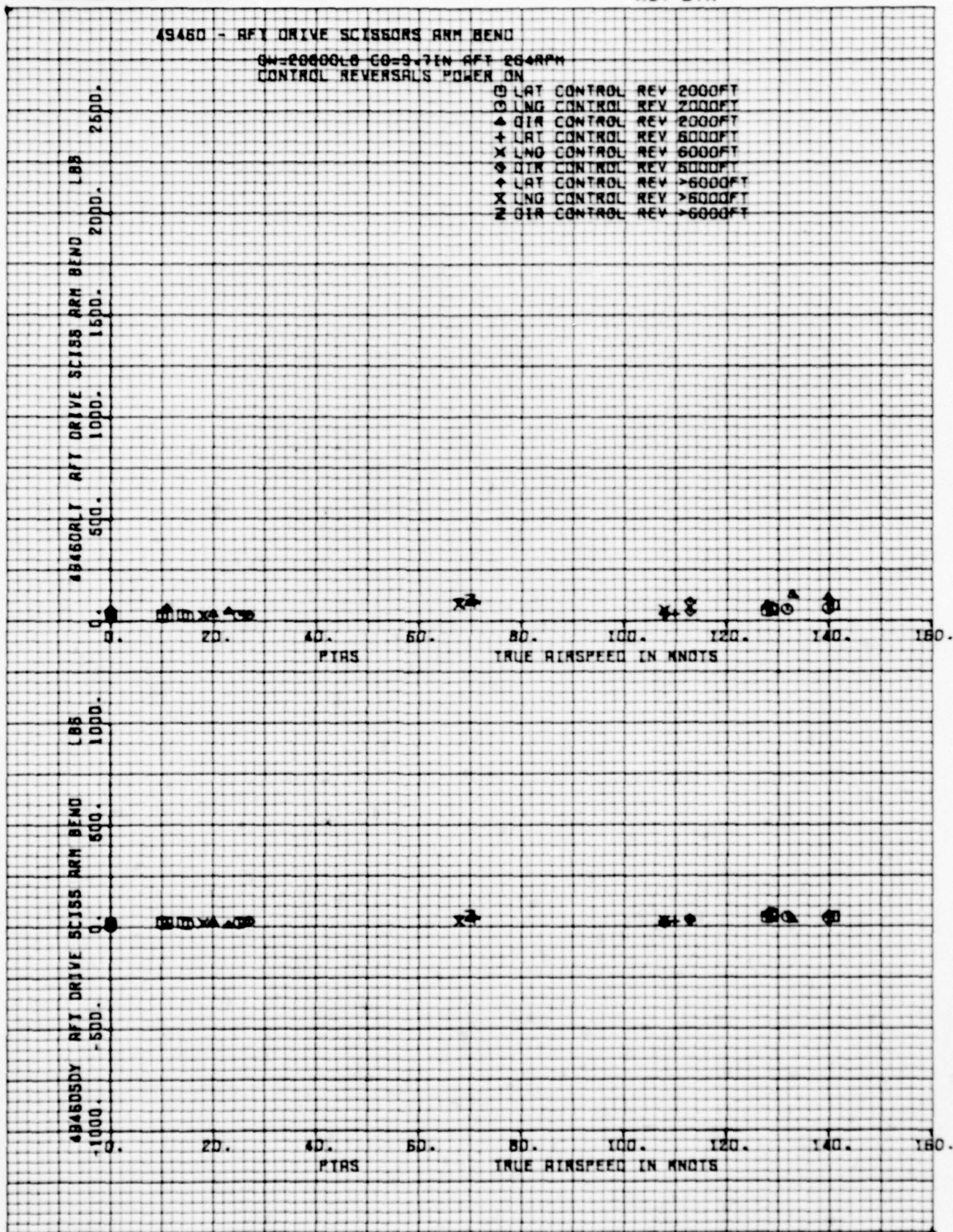
□ LEVEL FLIGHT 6000 FT



FORM 92300 (10/71)



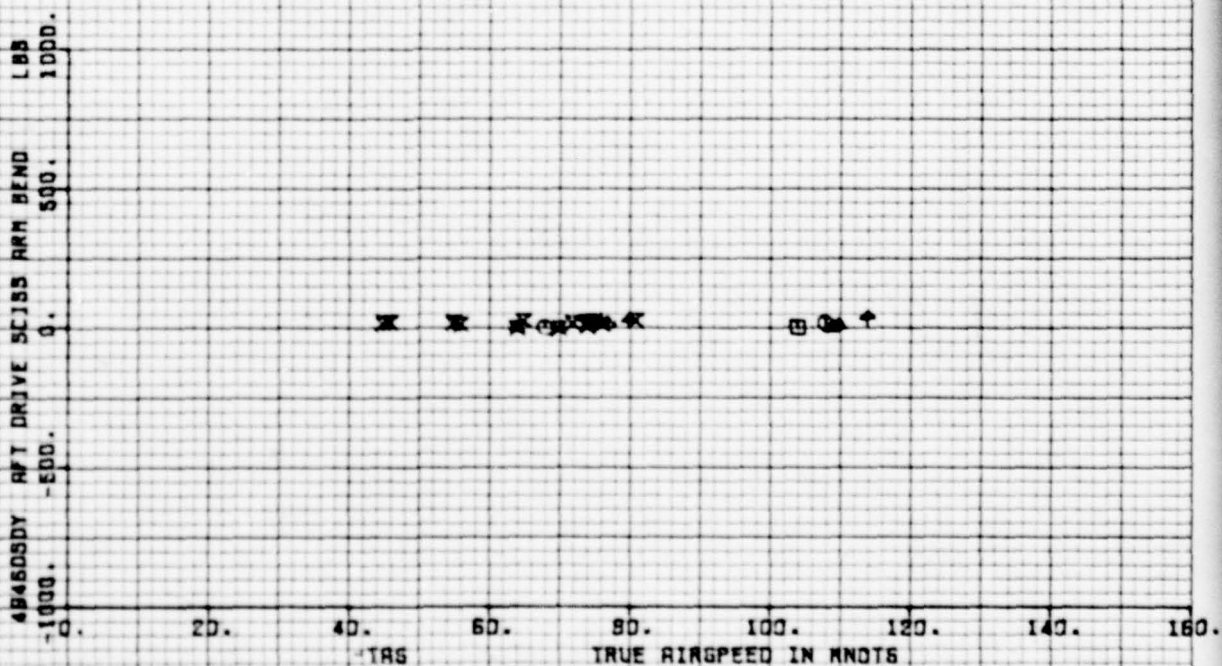
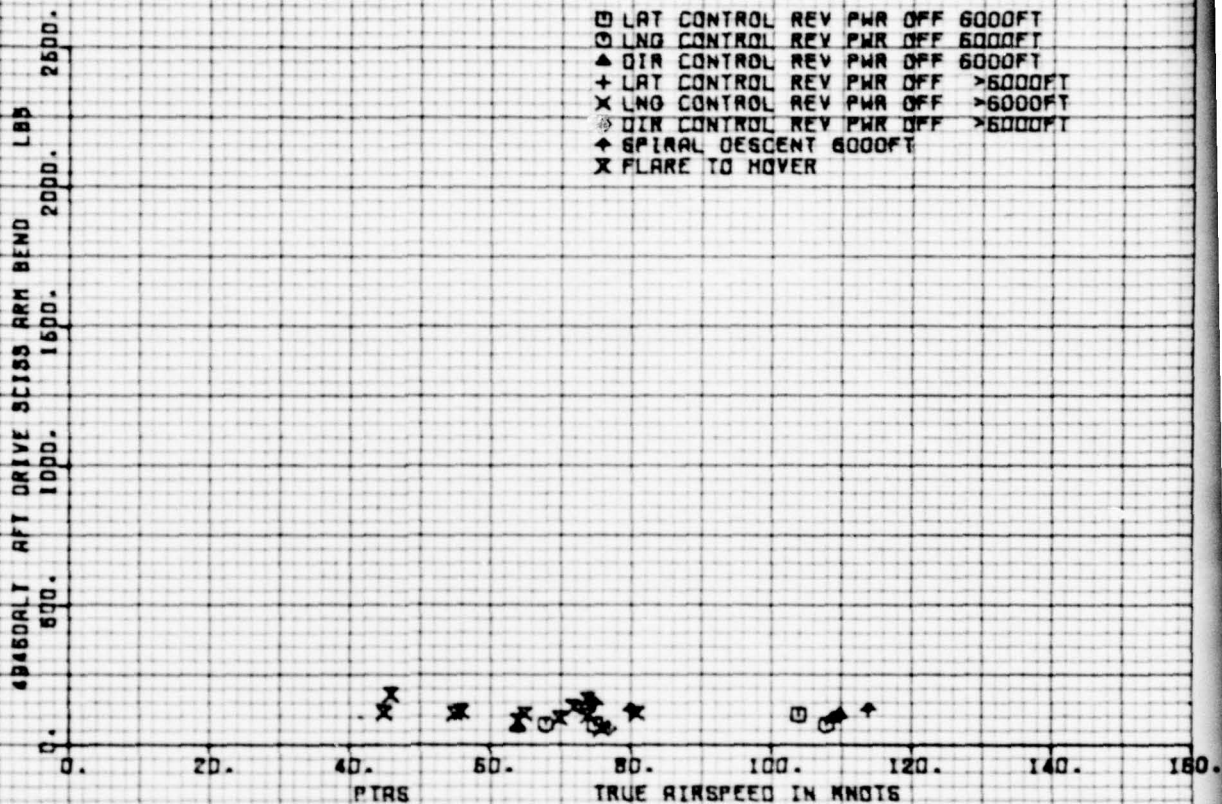


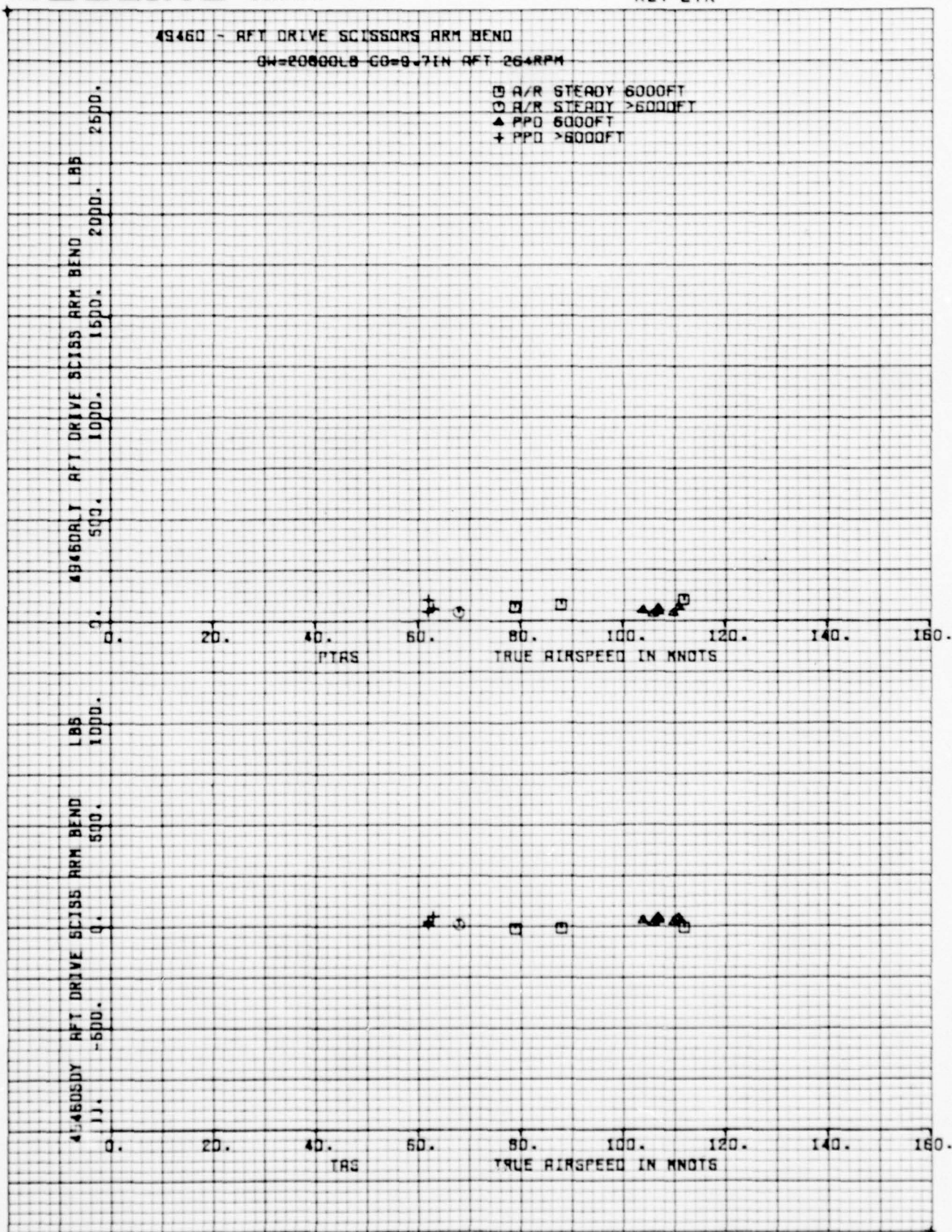


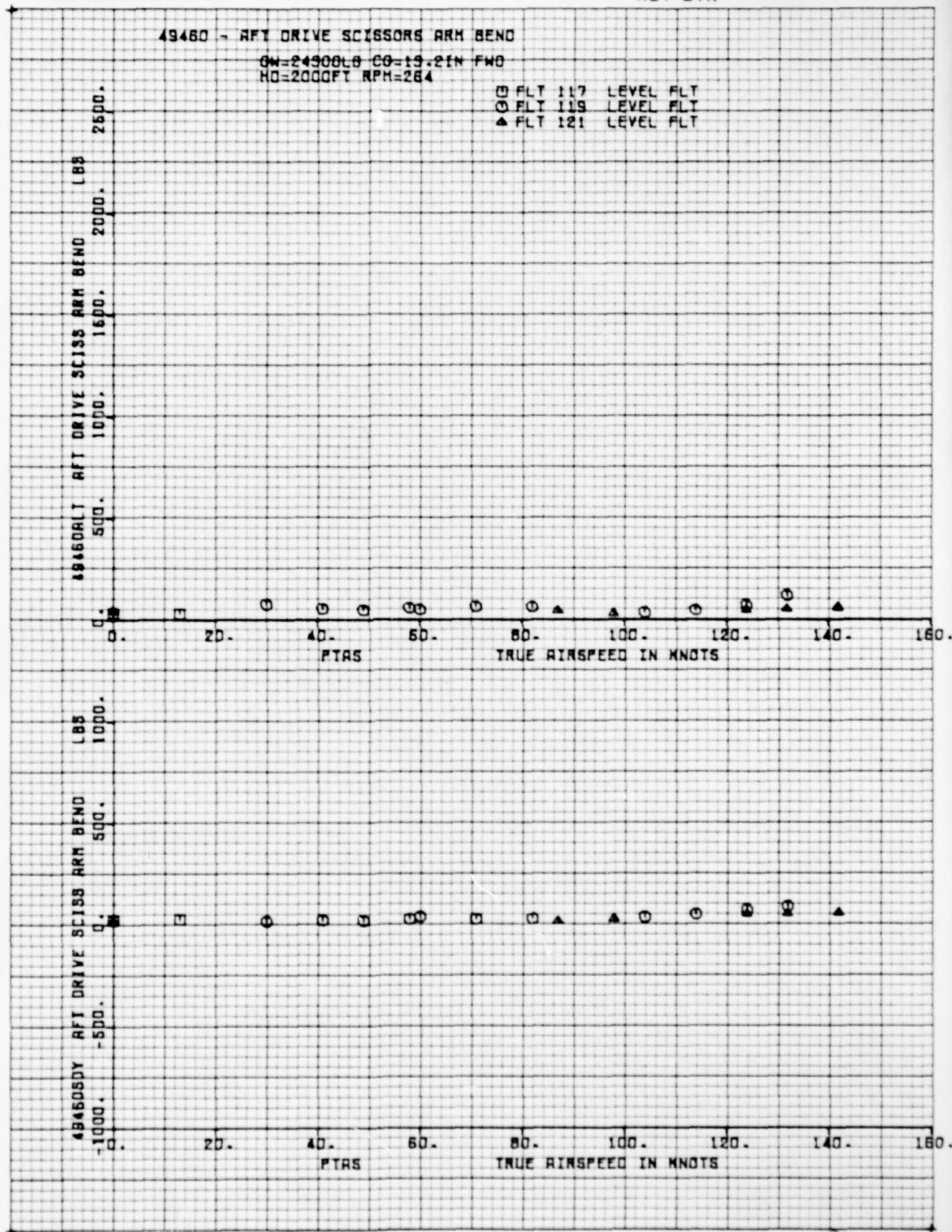
THE **BOEING** COMPANY

49460 - AFT DRIVE SCISSORS ARM BEND

GW=20800LB CG=9.7IN AFT 264RPM





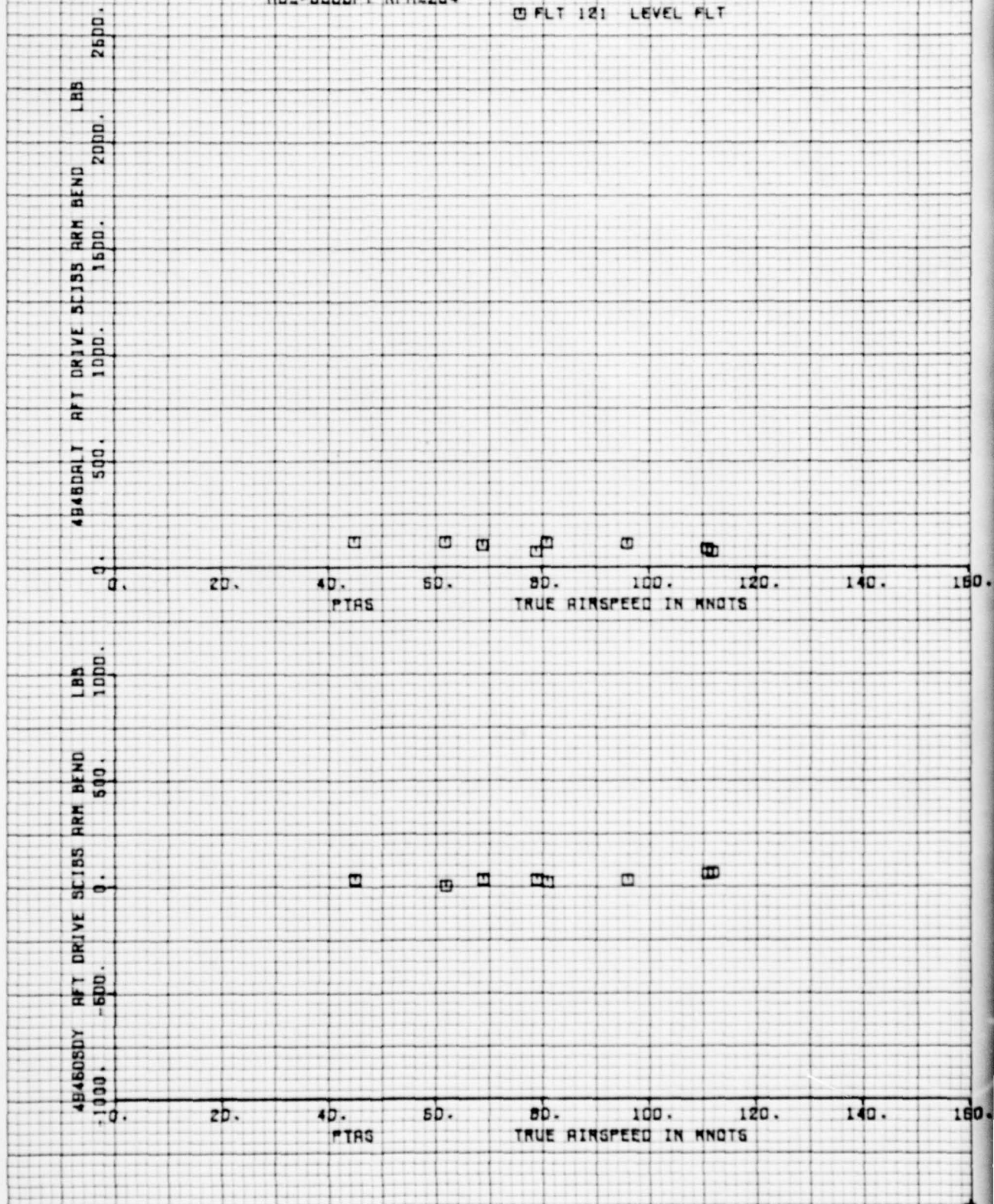


THE **BOEING** COMPANY

49480 - AFT DRIVE SCISSORS ARM BEND

GW=24300LB CG=13.2IN FWD
MO=>5000FT RPM=264

@ FLT 121 LEVEL FLT



FORM 52300 (10/71)

THE **BOEING** COMPANY

49480 - AFT DRIVE SCISSORS ARM BEND

GW=24500LB CG=13.2IN FWD
POWER ON & OFF PULLUPS

- LONG PULLUP PWR ON 2000FT
- CP PULLUP PWR ON 2000FT
- ▲ LONG PULLUP PWR ON >6000FT
- + CP PULLUP PWR ON >6000FT
- x CP PULLUP PWR OFF 2000FT
- § LONG PULLUP PWR OFF 2000FT
- † LONG PULLUP PWR OFF >6000FT
- X CP PULLUP PWR OFF >6000FT

49480LY AFT DRIVE SCISS ARM BEND LBB
2500.
2000.
1500.
1000.
500.
0.

0.

20.

40.

PTAS

60.

TRUE AIRSPEED IN KNOTS

100.

120.

140.

160.

49480SDY AFT DRIVE SCISS ARM BEND LBB
1000.
500.
0.
-500.
-1000.

0.

20.

40.

PTAS

60.

TRUE AIRSPEED IN KNOTS

100.

120.

140.

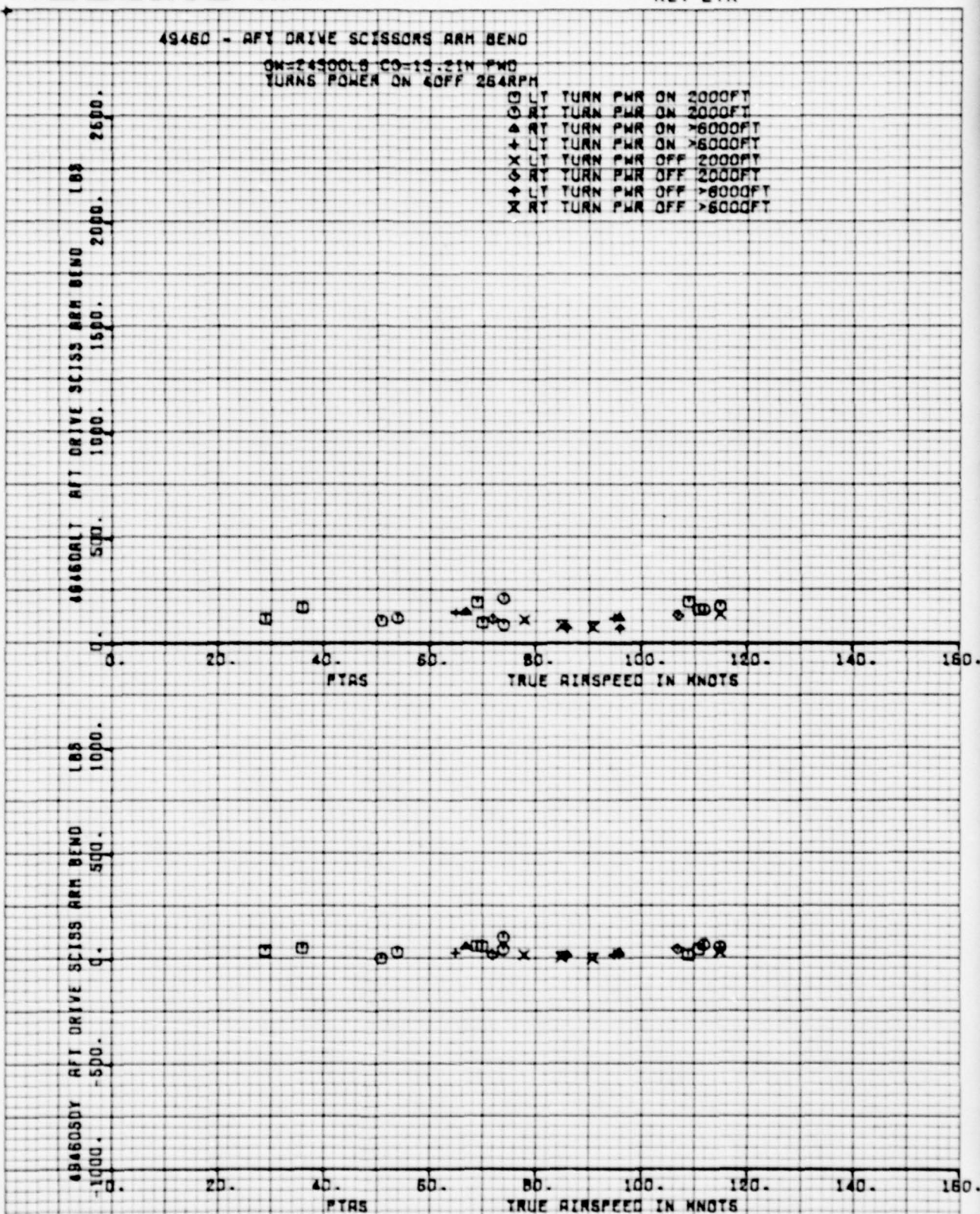
160.

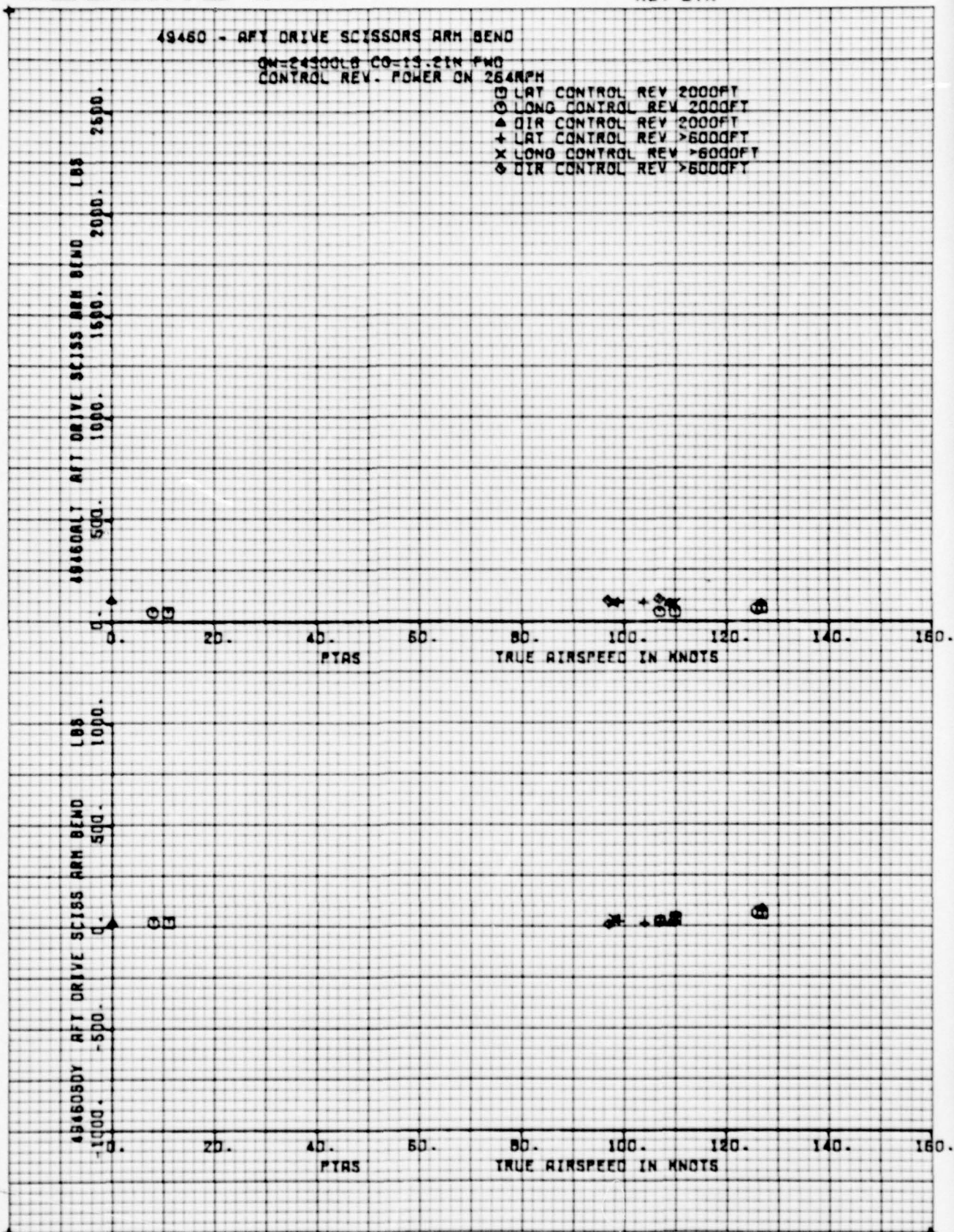
THE **BOEING** COMPANY

49460 - AFT DRIVE SCISSORS ARM BEND

OW=24500LB CO=15.2IN PWD
TURNS POWER ON 4OFF 264RPM

O LT TURN PWR ON 2000FT
 O RT TURN PWR ON 2000FT
 A RT TURN PWR ON >6000FT
 + LT TURN PWR ON >6000FT
 X LT TURN PWR OFF 2000FT
 S RT TURN PWR OFF 2000FT
 + LT TURN PWR OFF >6000FT
 X RT TURN PWR OFF >6000FT

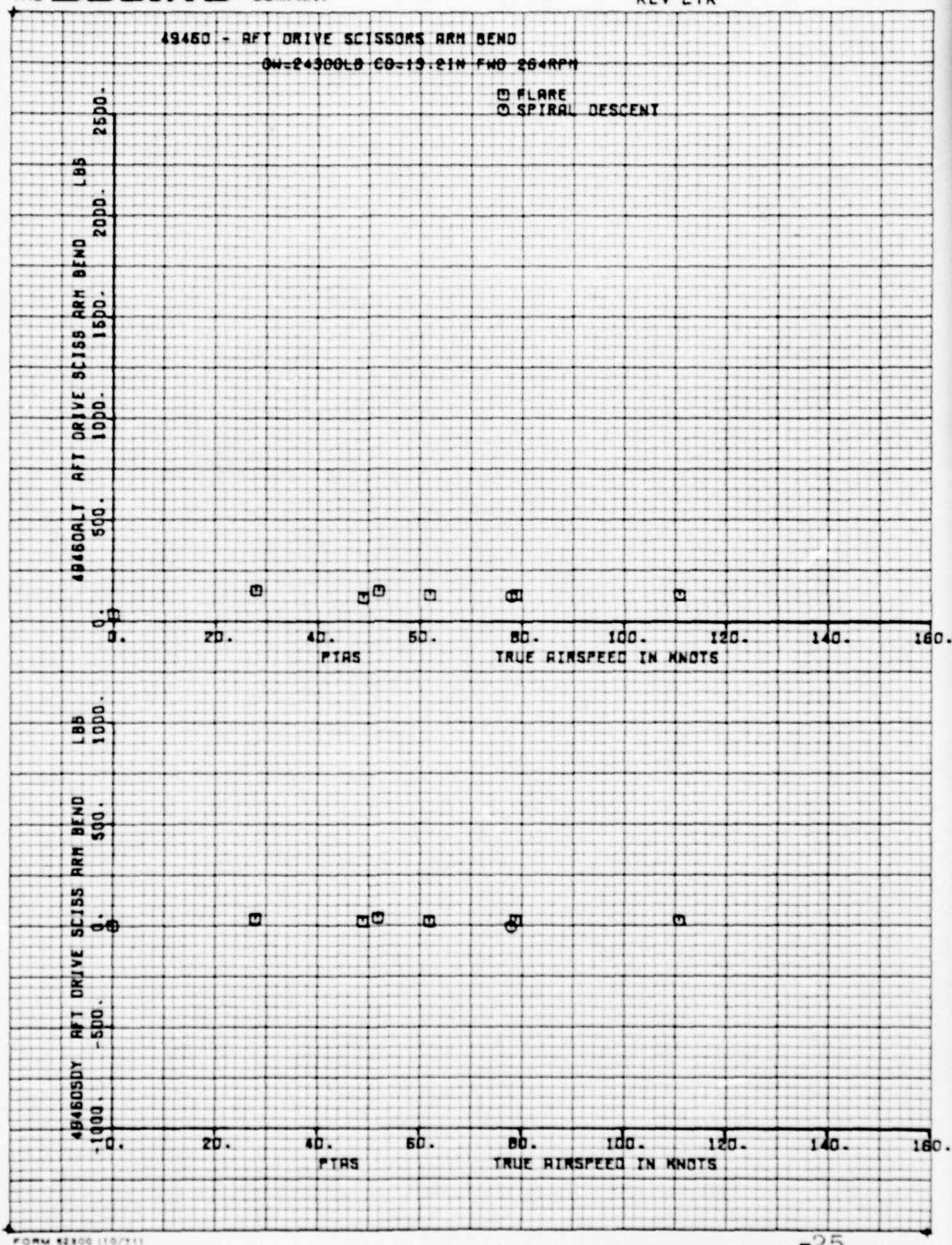




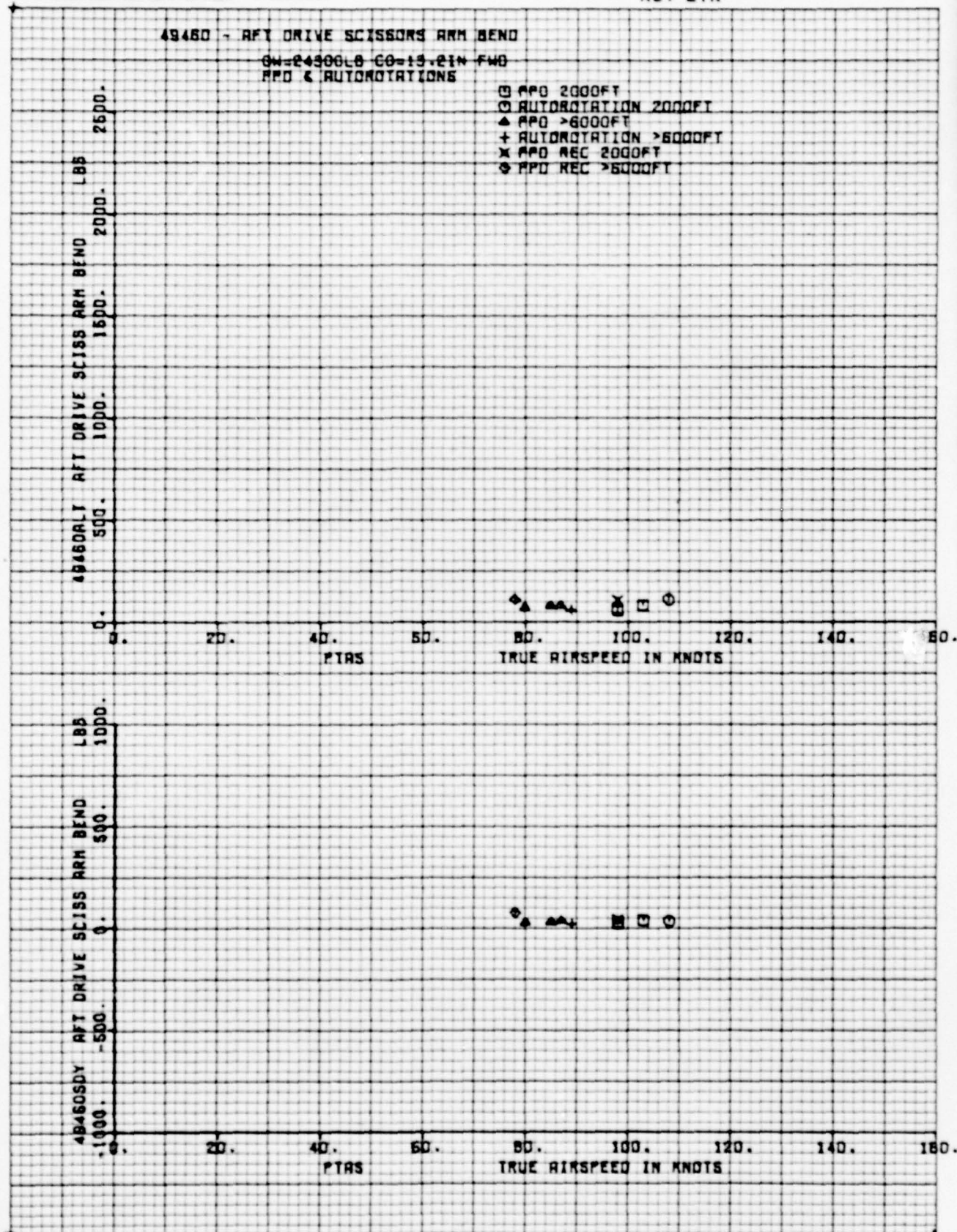
THE **BOEING** COMPANY

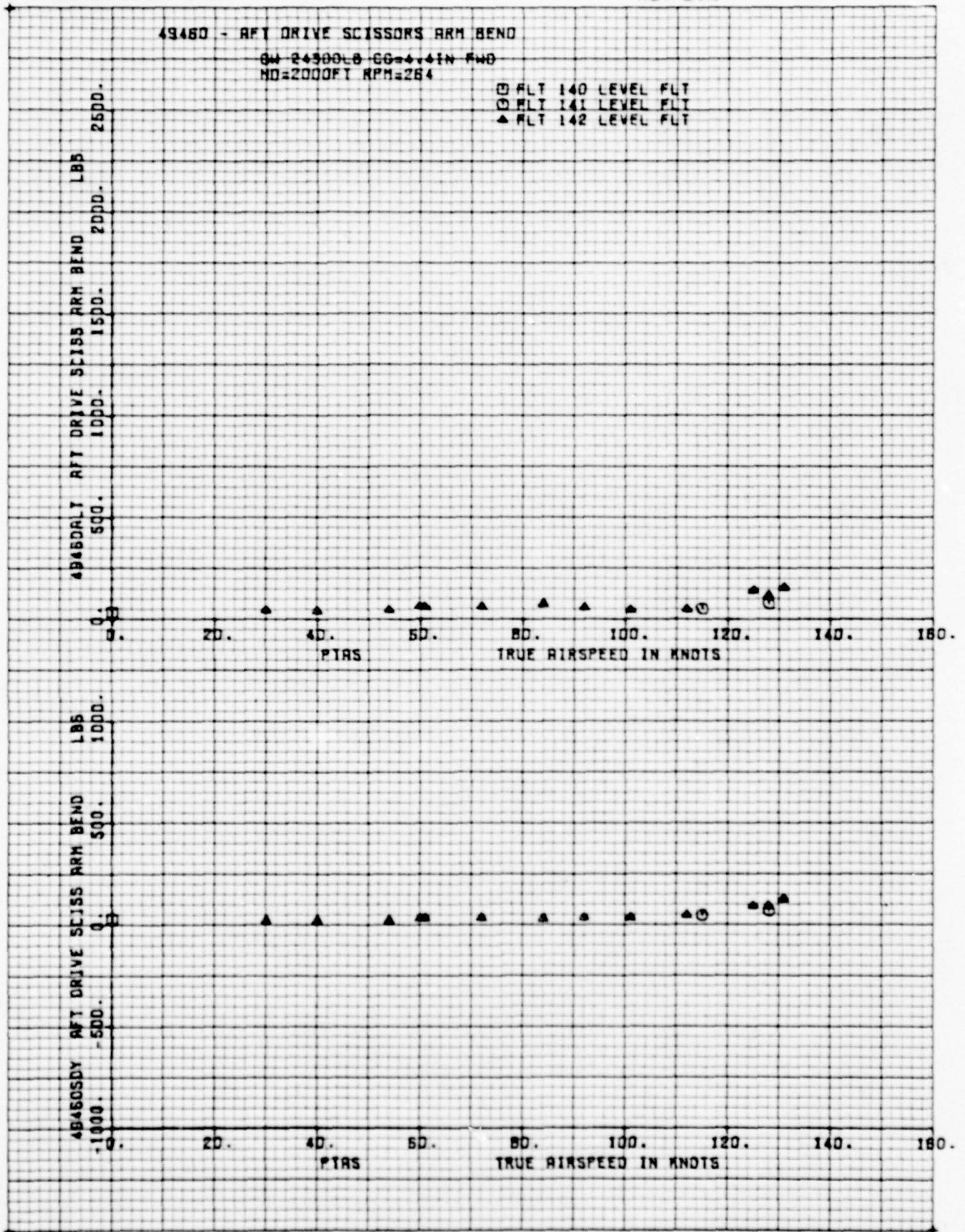
49450 - AFT DRIVE SCISSORS ARM BEND

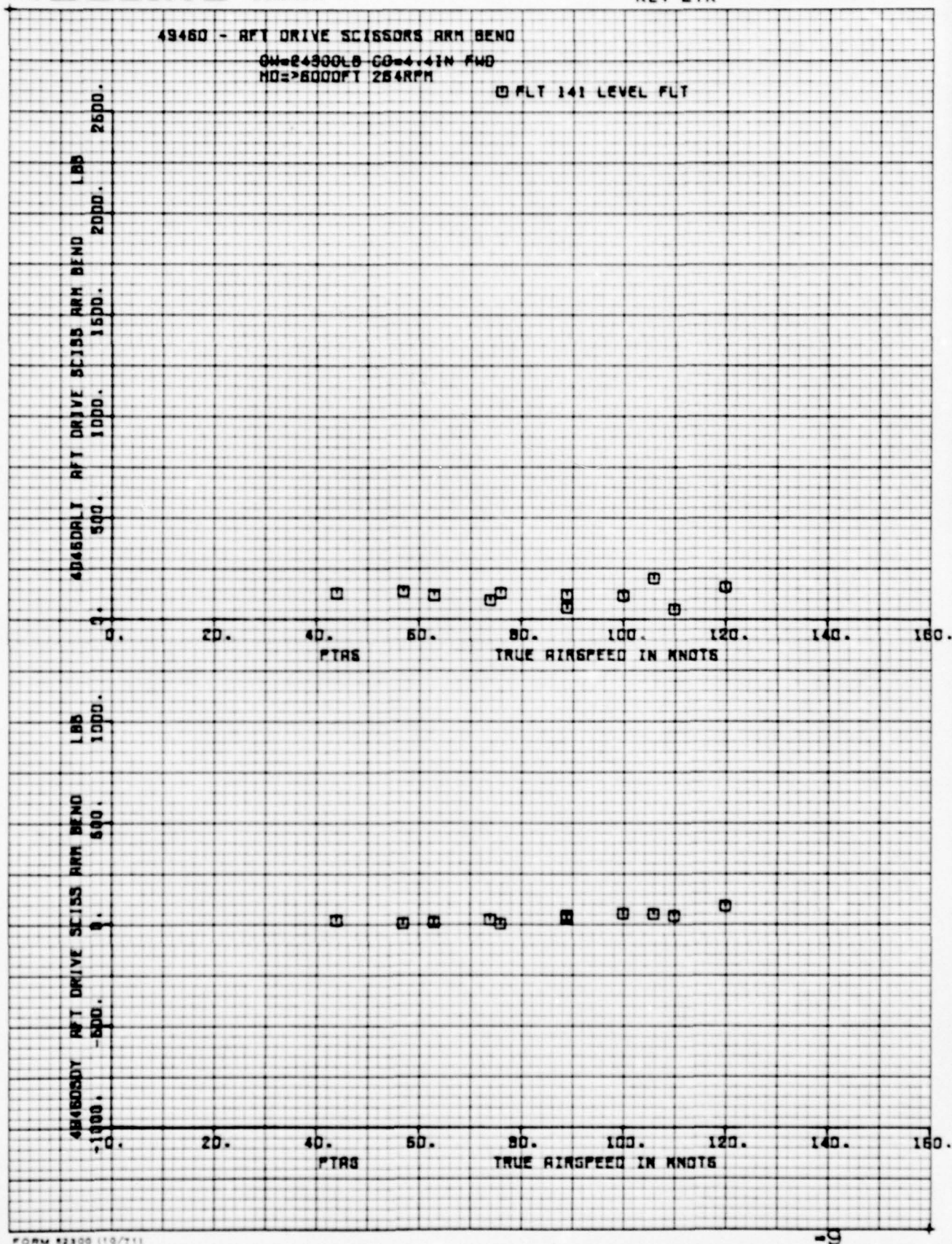
OW-24300LB CO-19.2IN FWD 264RPM

□ FLARE
○ SPIRAL DESCENT

FORM 52300 (10/71)





THE **BOEING** COMPANY

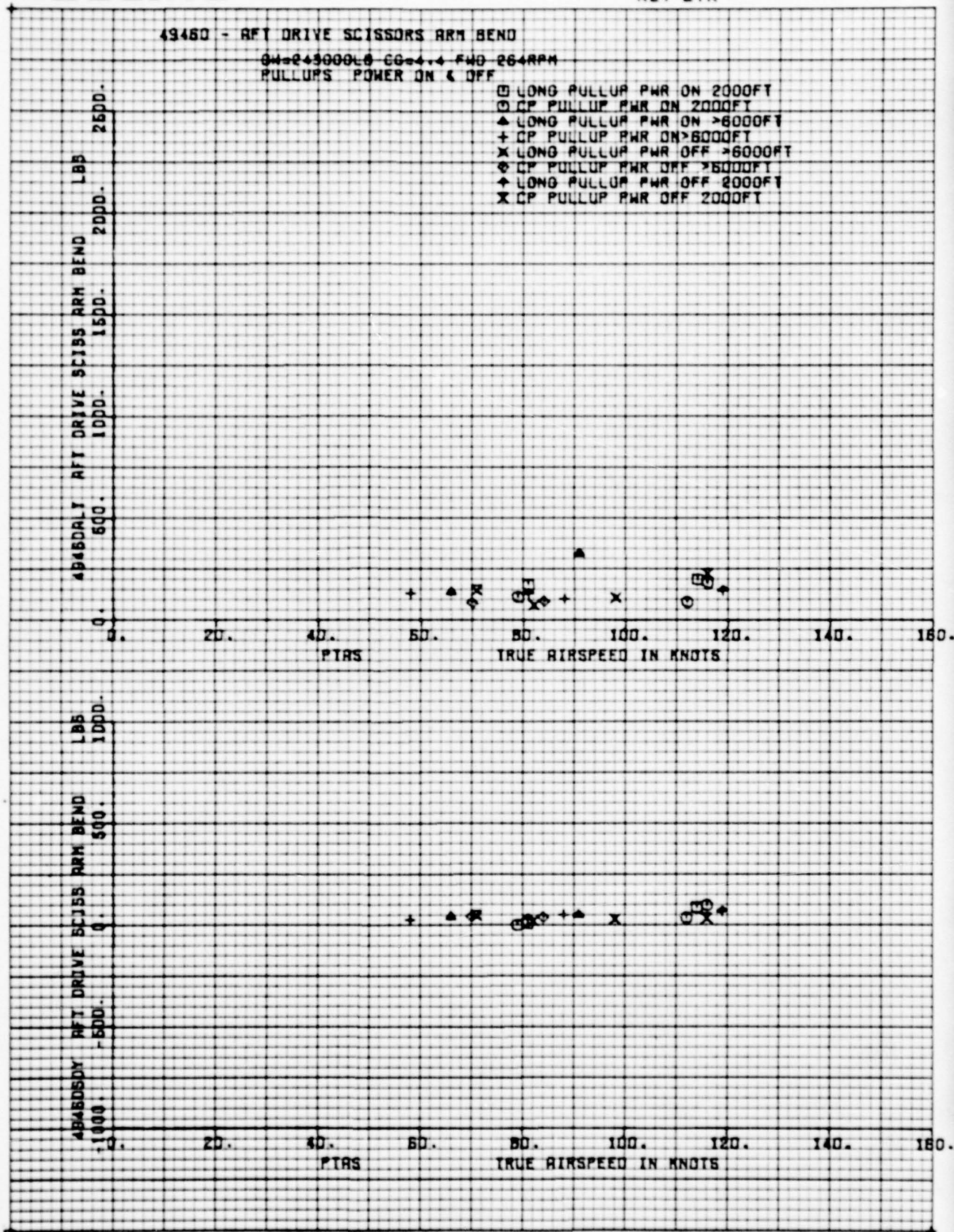
FORM 52800 (10/71)

THE **BOEING** COMPANY

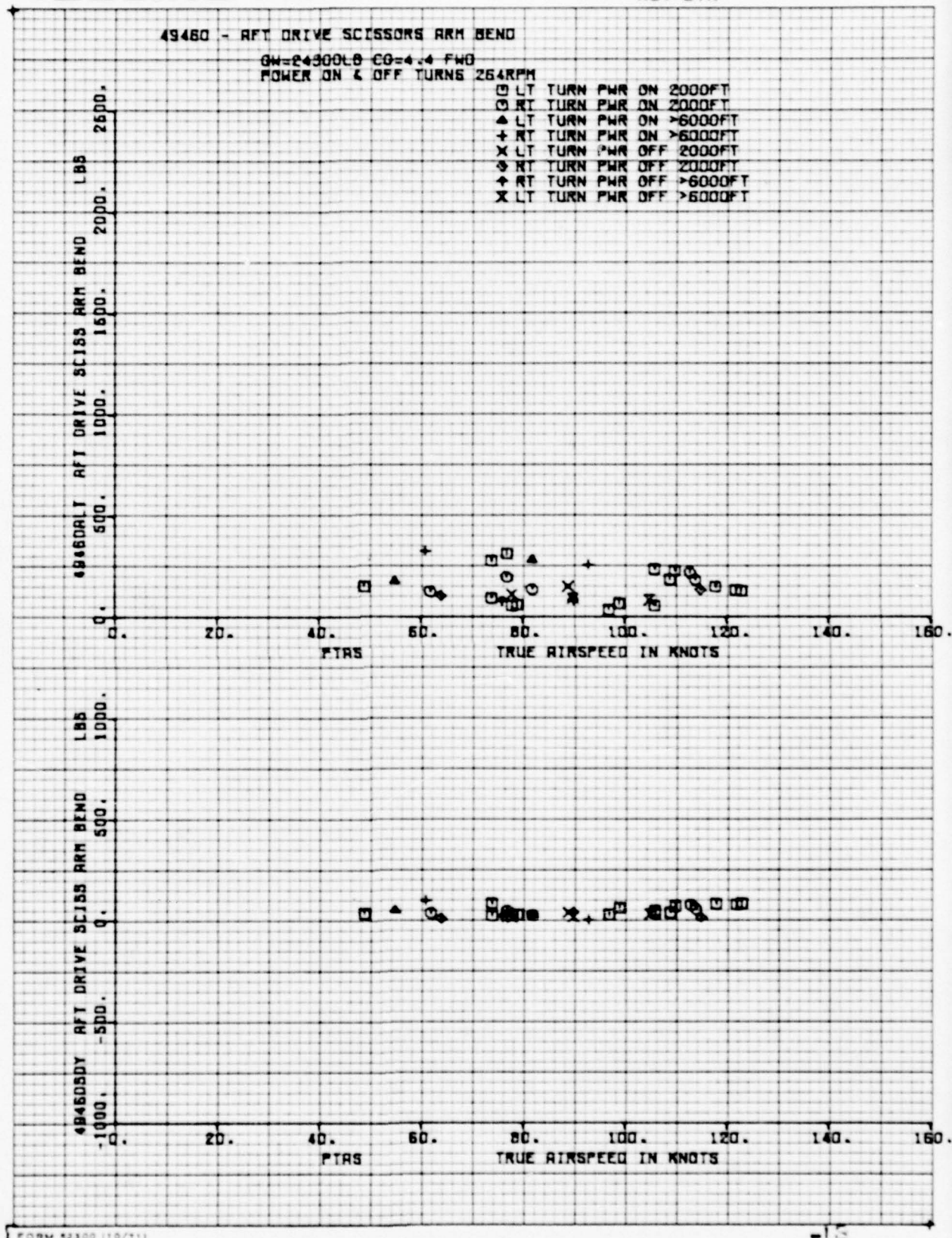
49460 - AFT DRIVE SCISSORS ARM BEND

GW=24500LB GG=4.4 FWD 264RPM
PULLUPS POWER ON & OFF

- LONG PULLUP PWR ON 2000FT
- CP PULLUP PWR ON 2000FT
- ▲ LONG PULLUP PWR ON >6000FT
- + CP PULLUP PWR ON >6000FT
- x LONG PULLUP PWR OFF >6000FT
- ◇ CP PULLUP PWR OFF >6000FT
- ◆ LONG PULLUP PWR OFF 2000FT
- x CP PULLUP PWR OFF 2000FT



FORM 82300 (10/71)

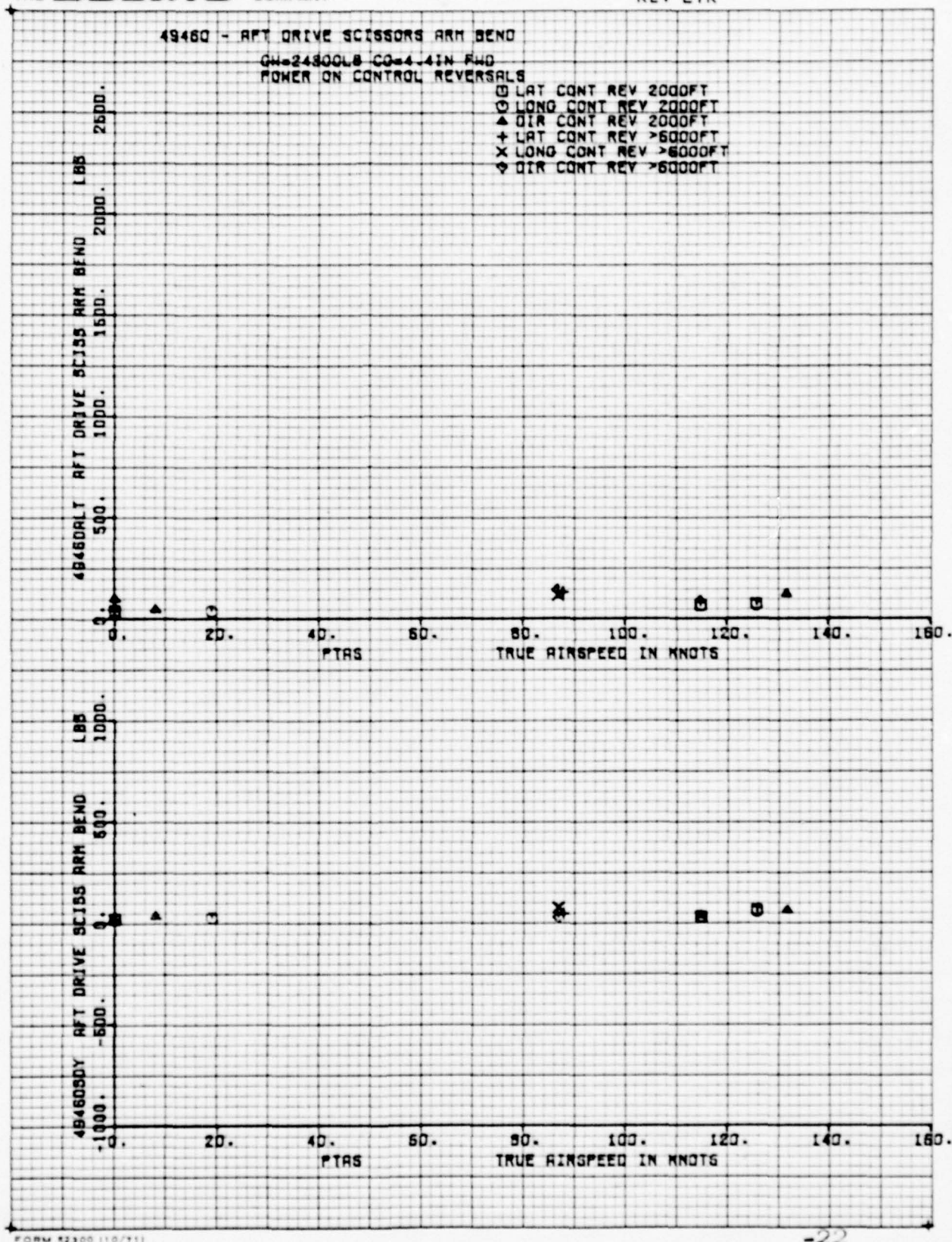


THE **BOEING** COMPANY

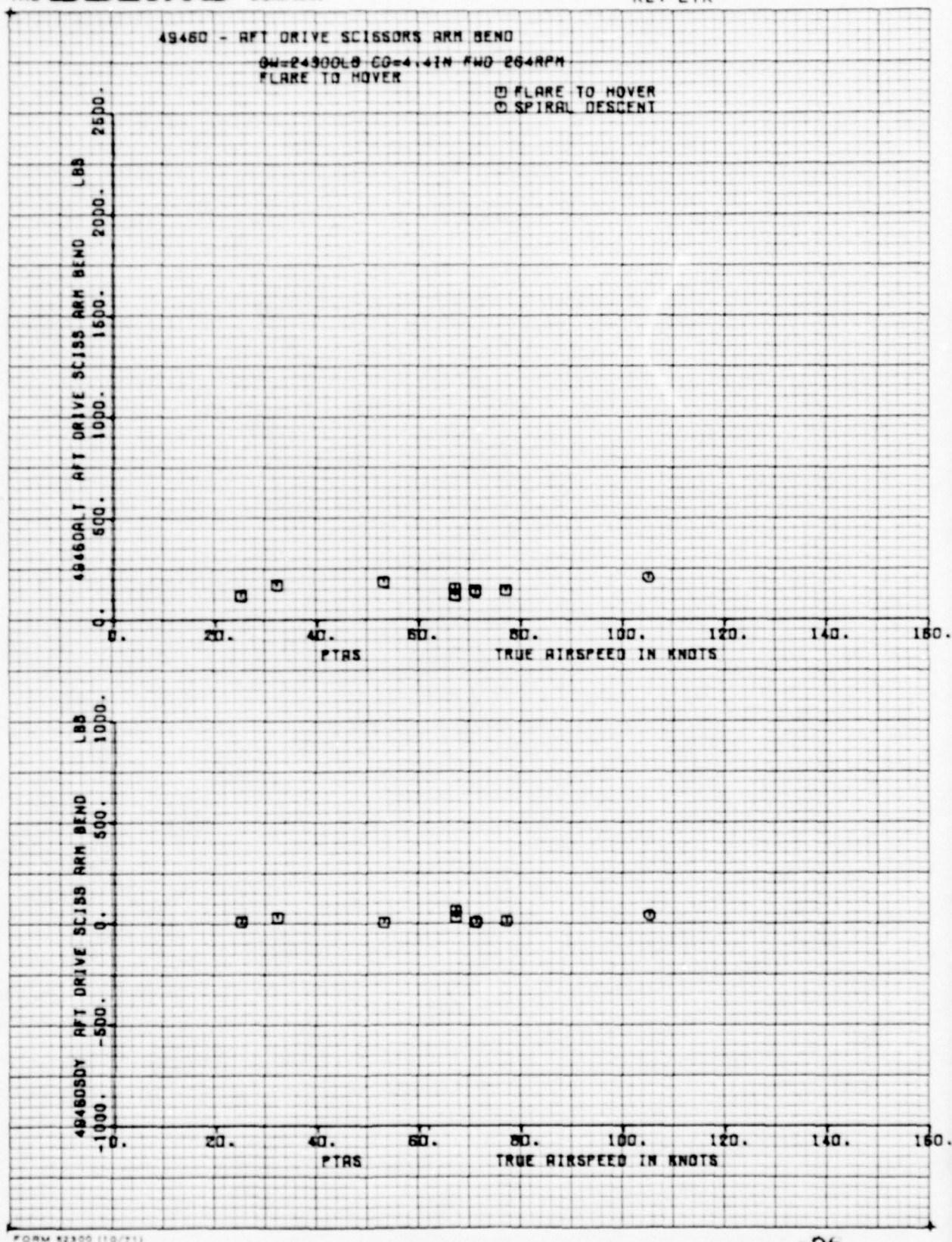
49460 - AFT DRIVE SCISSORS ARM BEND

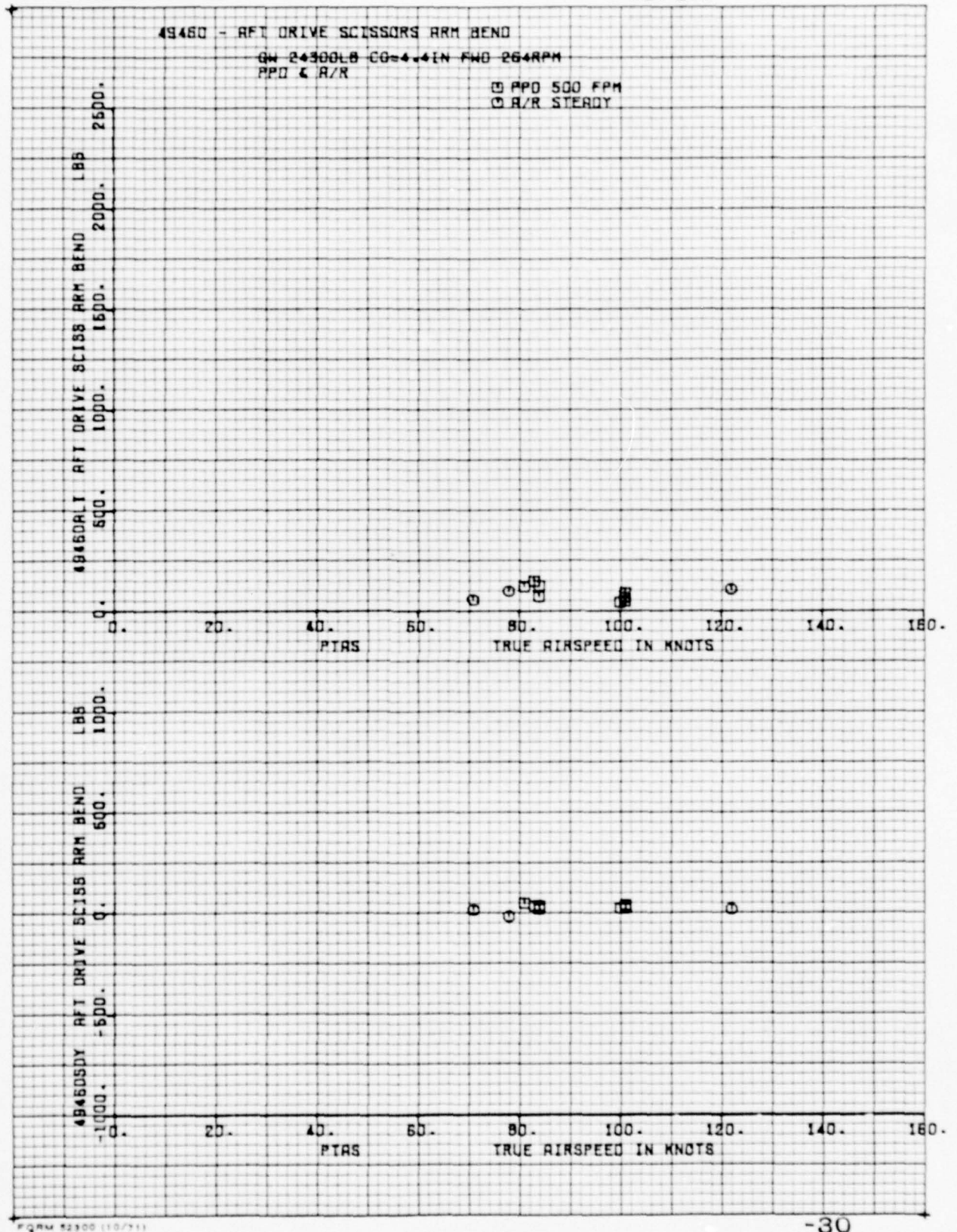
GW=24800LB CO=4.4IN FWD
POWER ON CONTROL REVERSALS

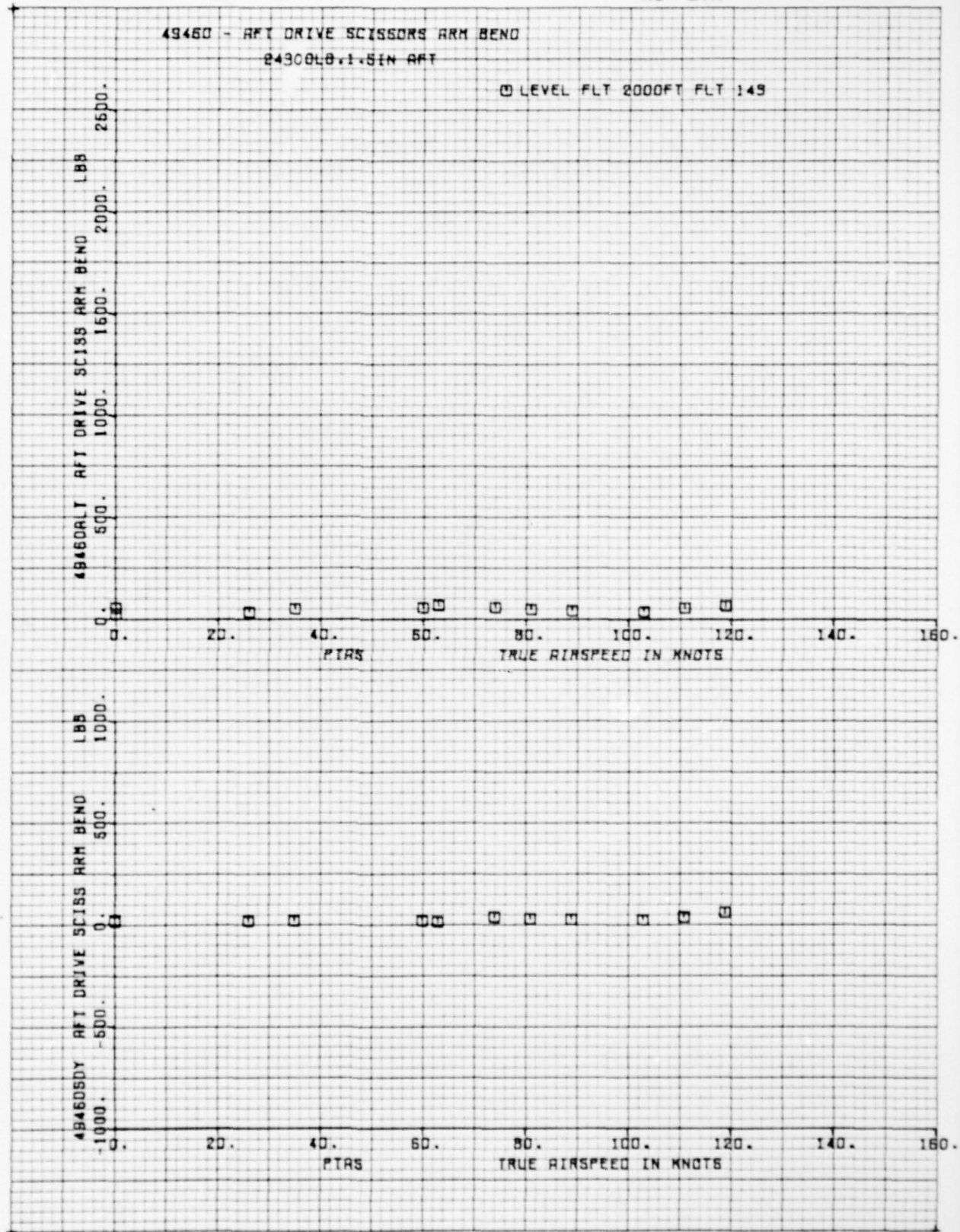
- LAT CONT REV 2000FT
- LONG CONT REV 2000FT
- ▲ DIR CONT REV 2000FT
- + LAT CONT REV >6000FT
- x LONG CONT REV >6000FT
- ◇ DIR CONT REV >6000FT



FORM 82300 (10/71)

THE **BOEING** COMPANY

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PREPARED BY: J. Bendo

CHECKED BY:

DATE: 8/28/78

NUMBER D210-11168-3

REV LTR Volume 7

MODEL NO.

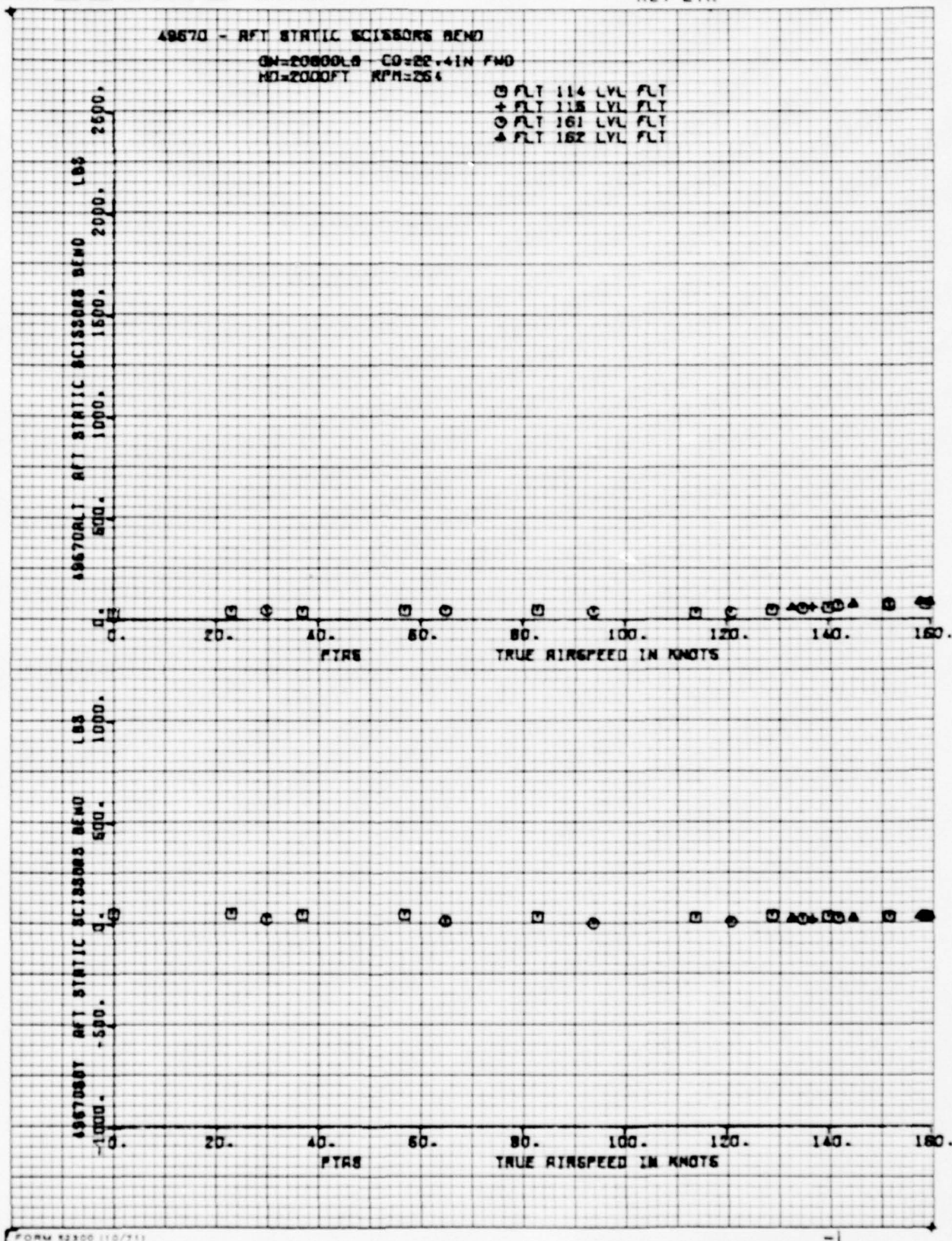
4.5 Aft Static Scissors

THE **BOEING** COMPANY

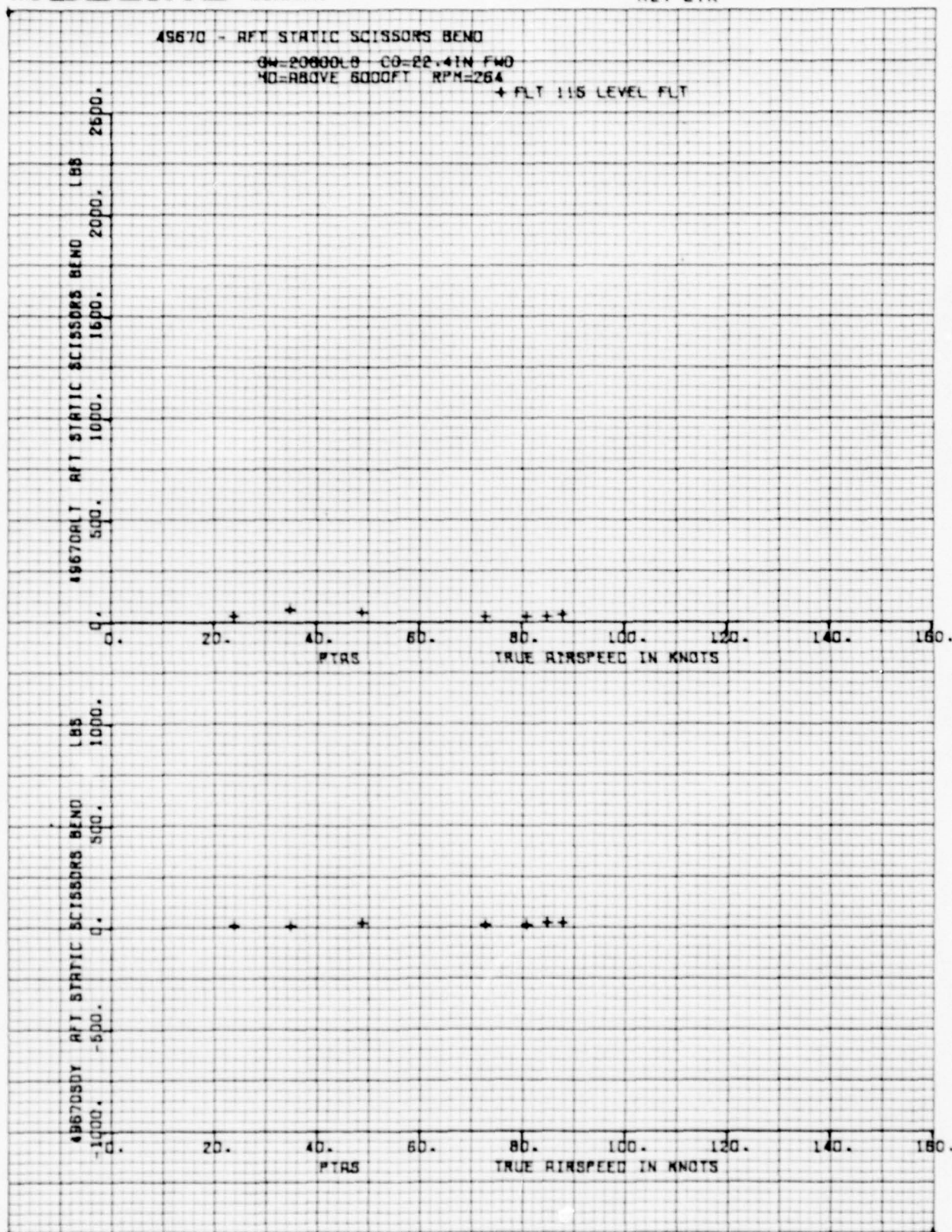
A9670 - RFT STATIC SCISSORS DEMO

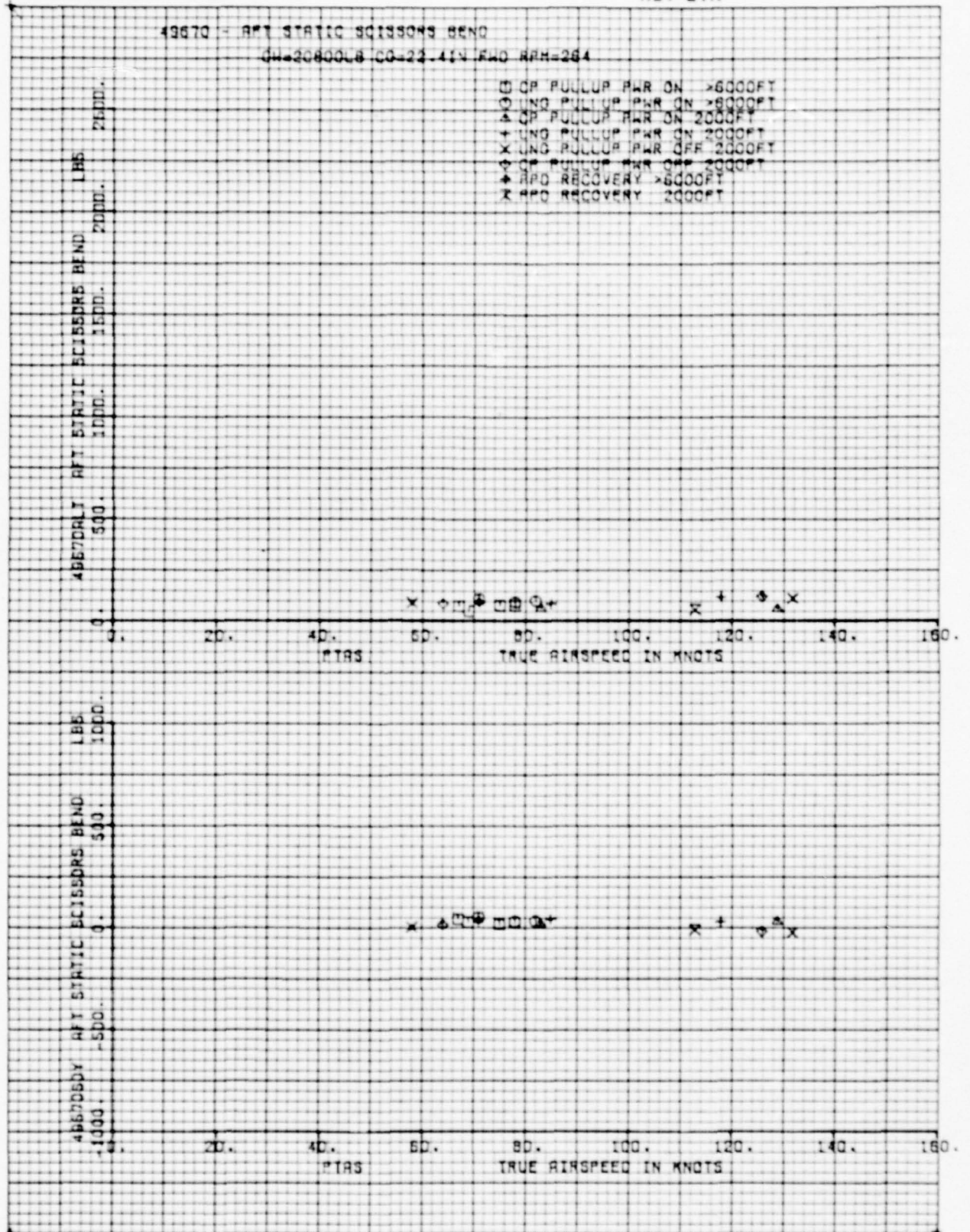
GN=20000LB CO=22.4IN FWD
HD=2000FT RPM=264

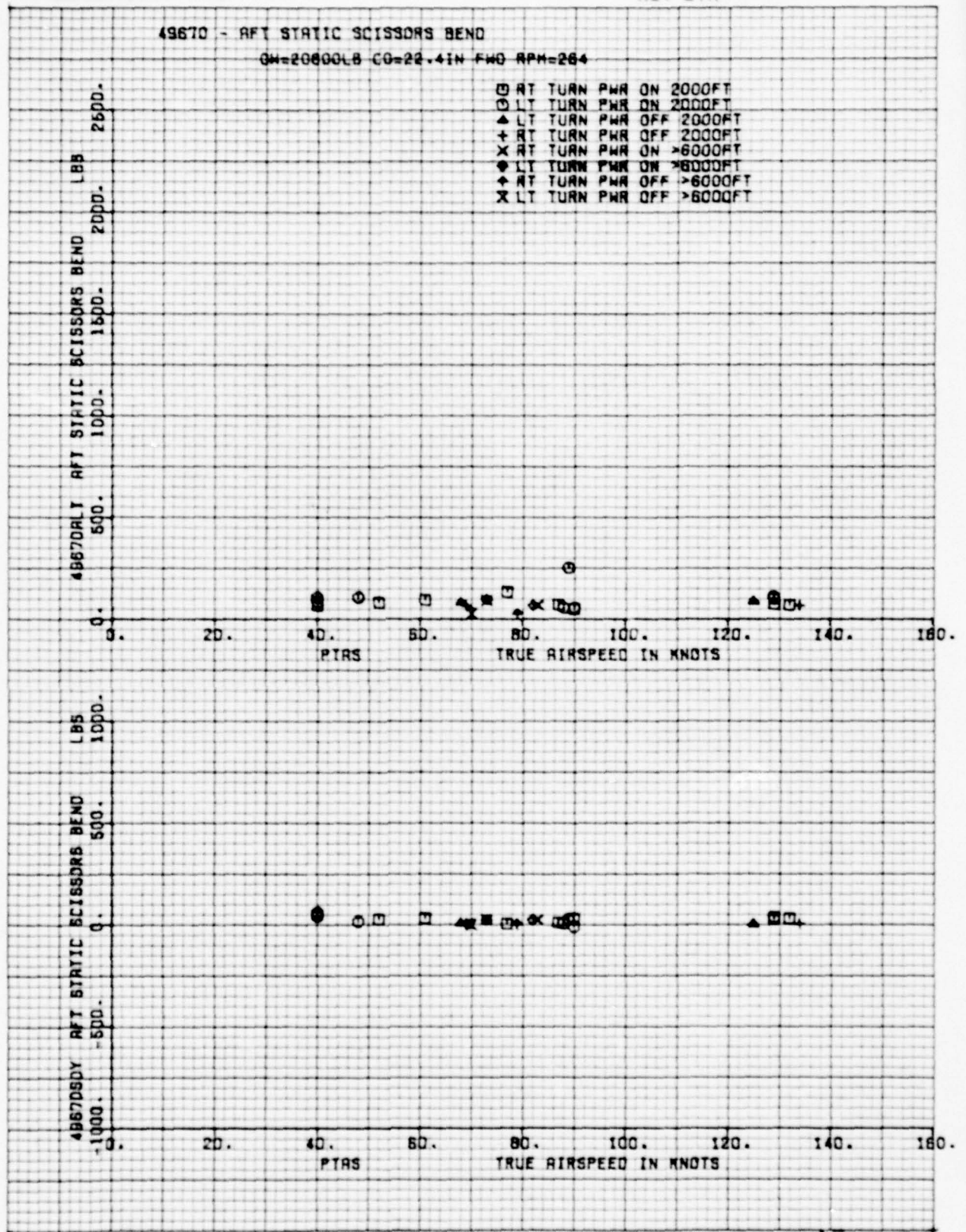
O FLT 114 LVL FLT
 + FLT 115 LVL FLT
 O FLT 161 LVL FLT
 A FLT 162 LVL FLT



FORM 82300 (10/71)





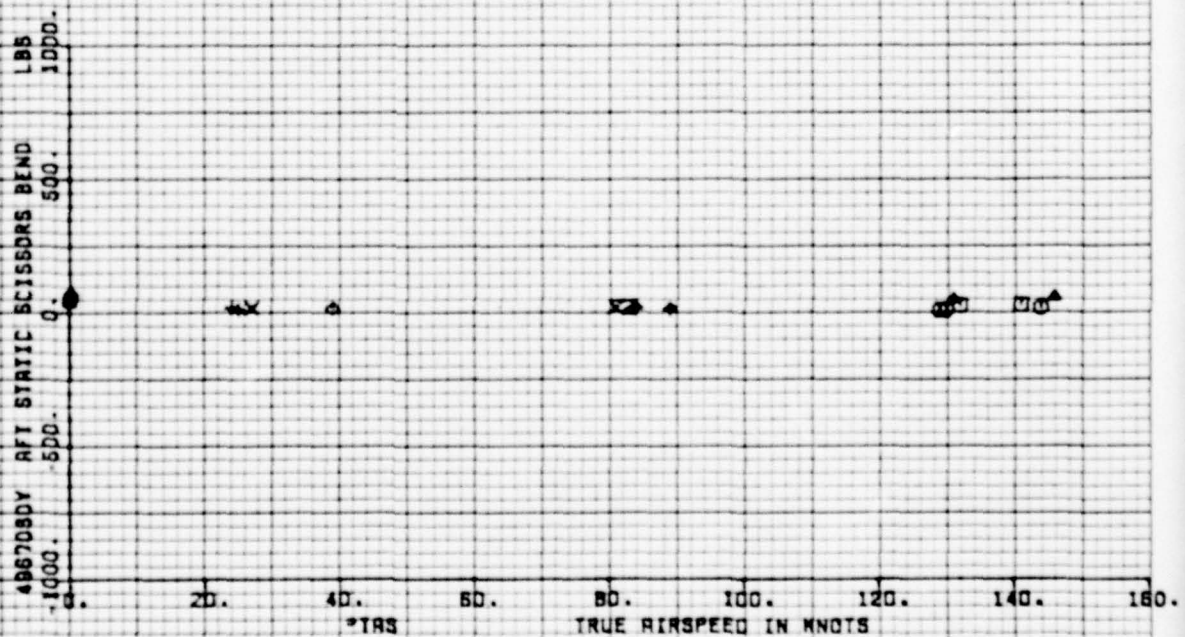
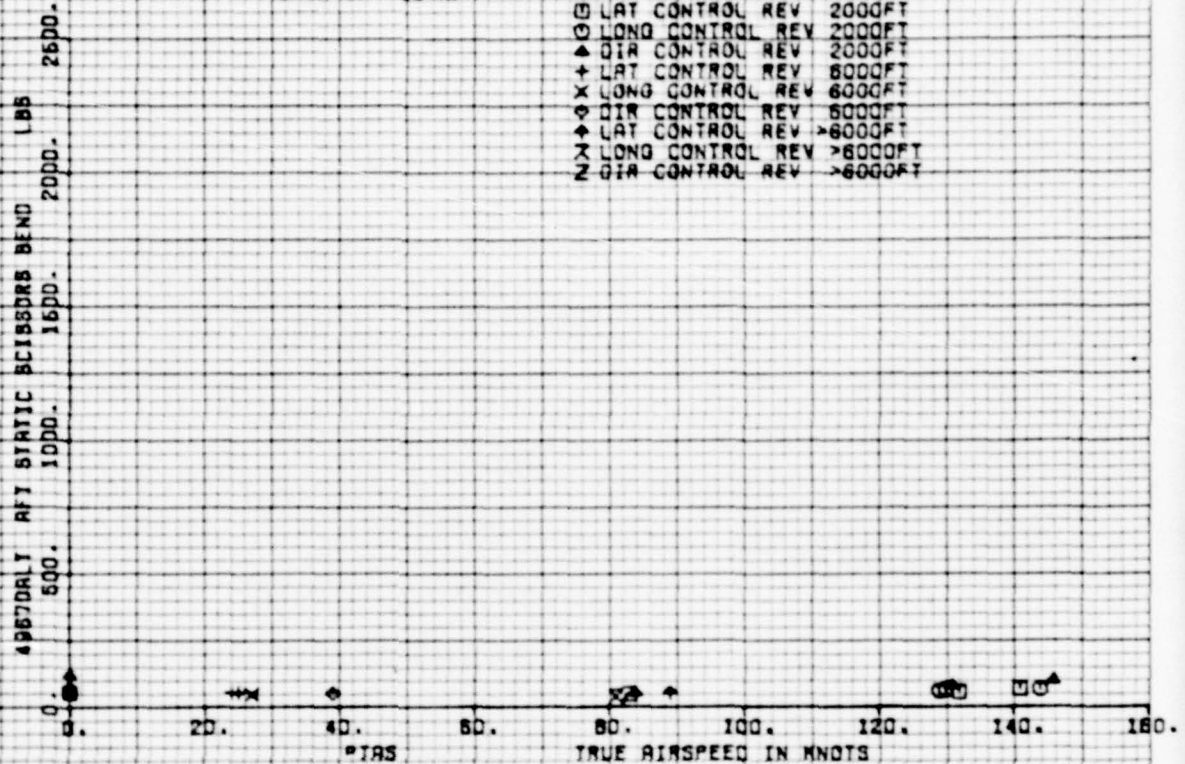


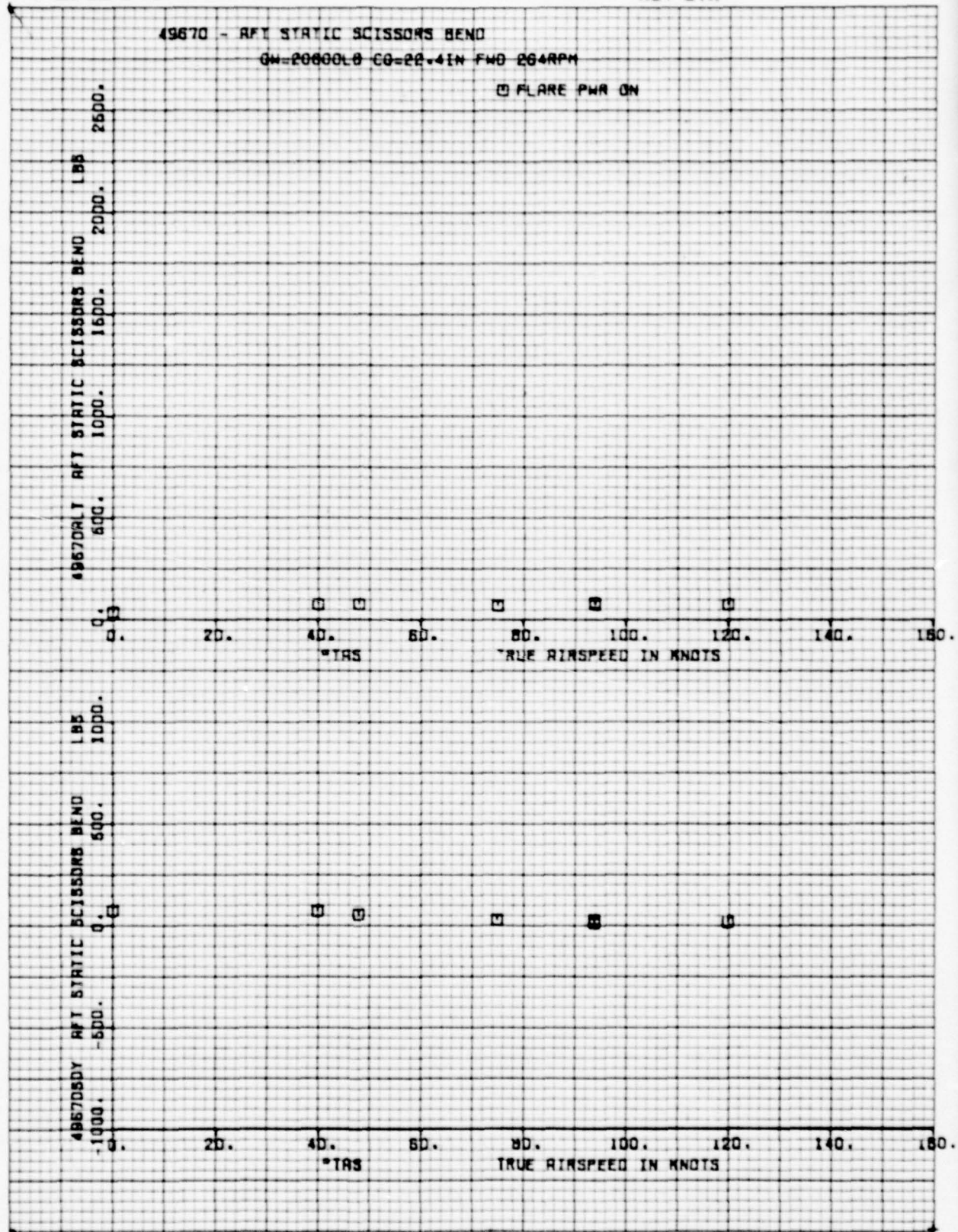
FORM 52300 (10/71)

49670 - AFT STATIC SCISSORS BEND

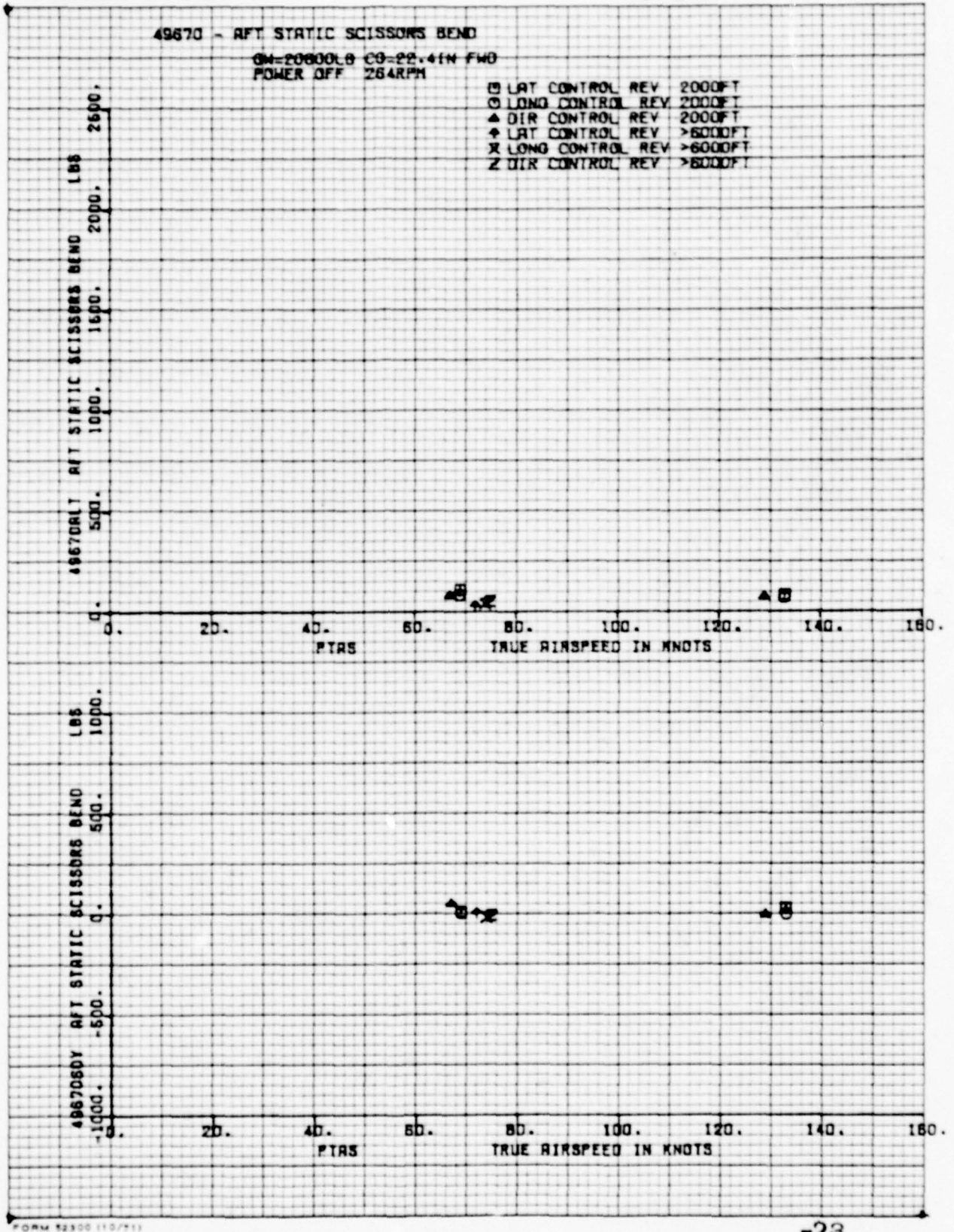
OW-20800LB CO-22.4IN FWD
POWER ON 264RPM

- LAT CONTROL REV 2000FT
- LONG CONTROL REV 2000FT
- ▲ DIR CONTROL REV 2000FT
- + LAT CONTROL REV 6000FT
- x LONG CONTROL REV 6000FT
- ◇ DIR CONTROL REV 6000FT
- ◆ LAT CONTROL REV >6000FT
- × LONG CONTROL REV >6000FT
- z DIR CONTROL REV >6000FT



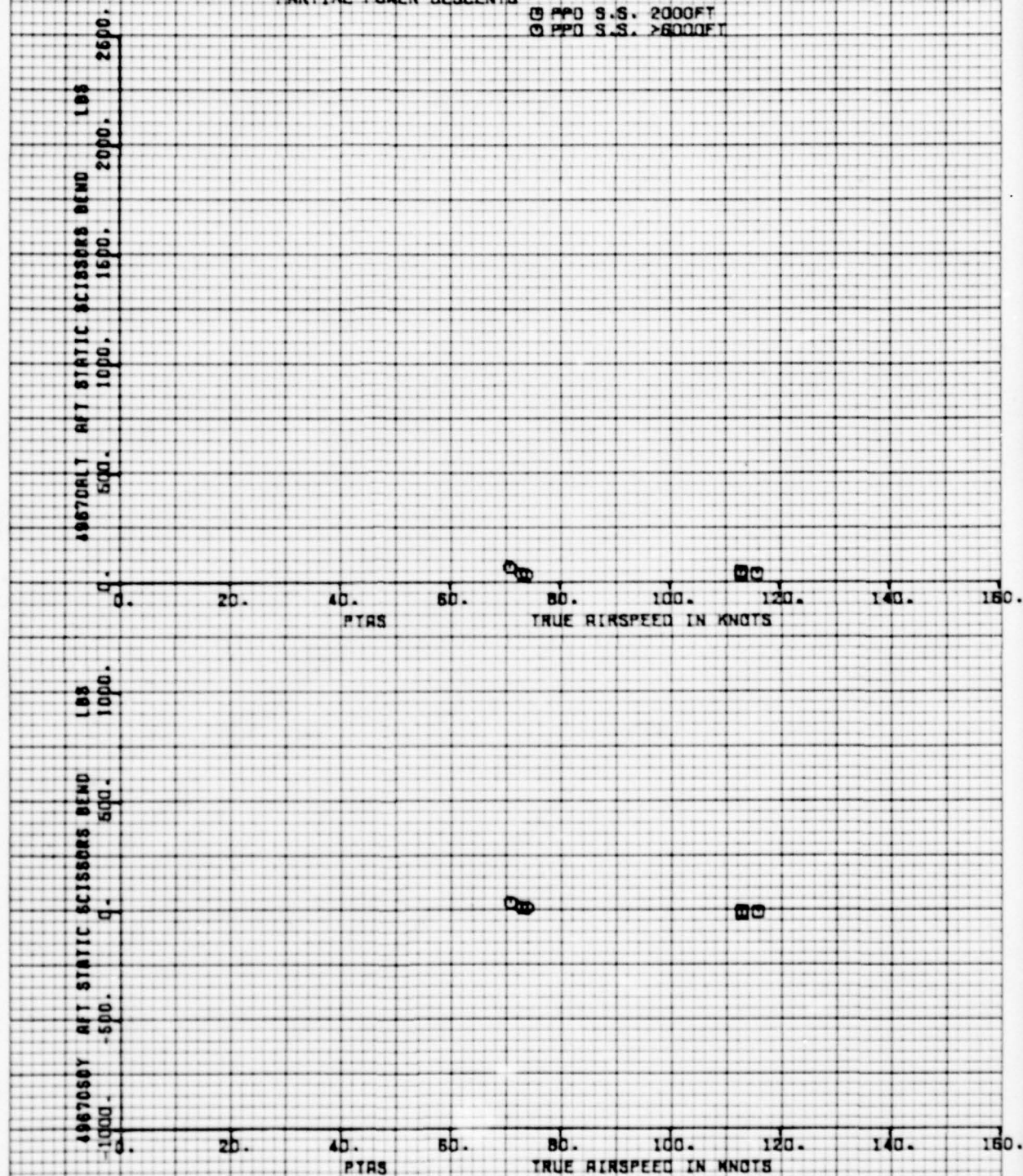


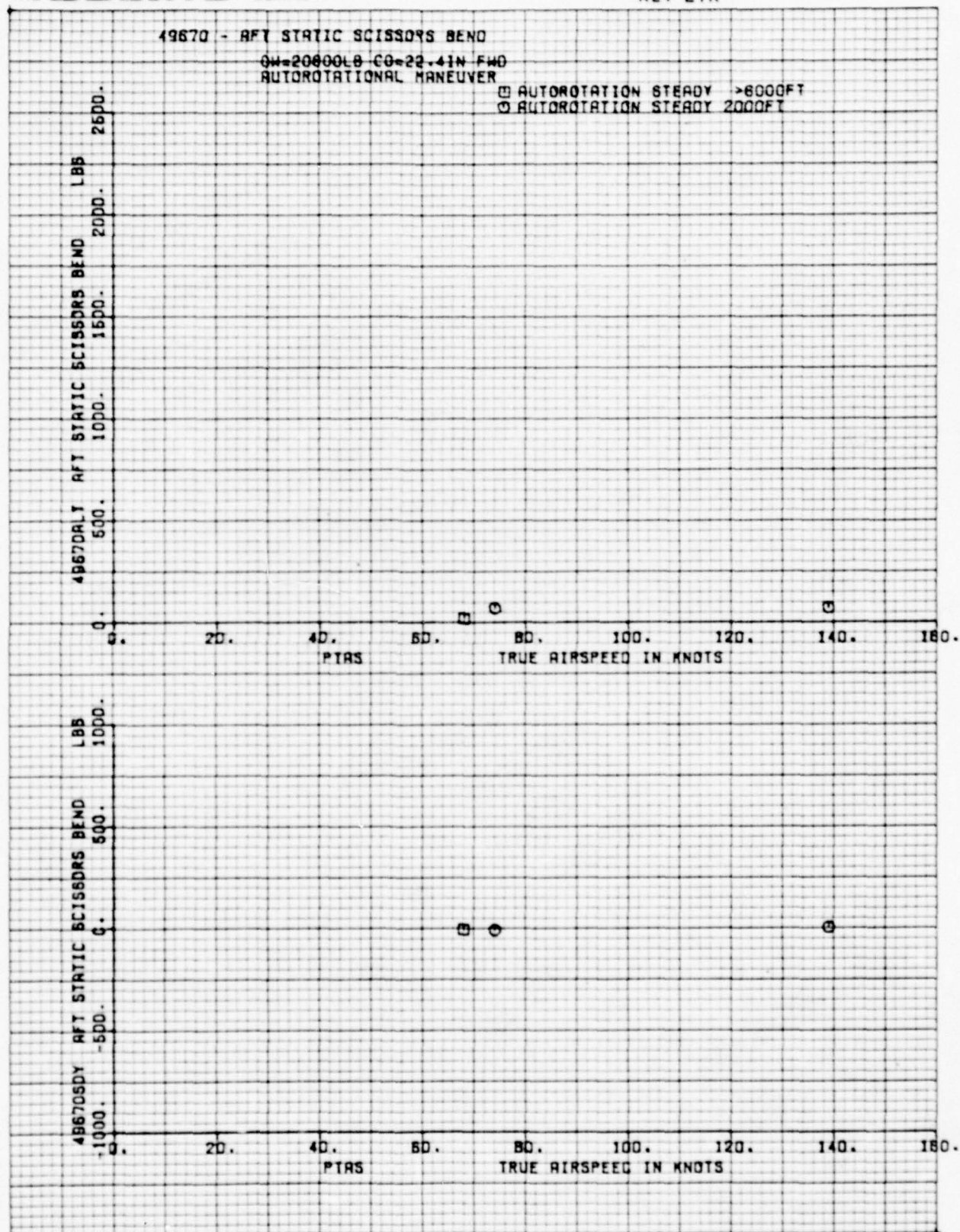
FORM 52300 (10/71)



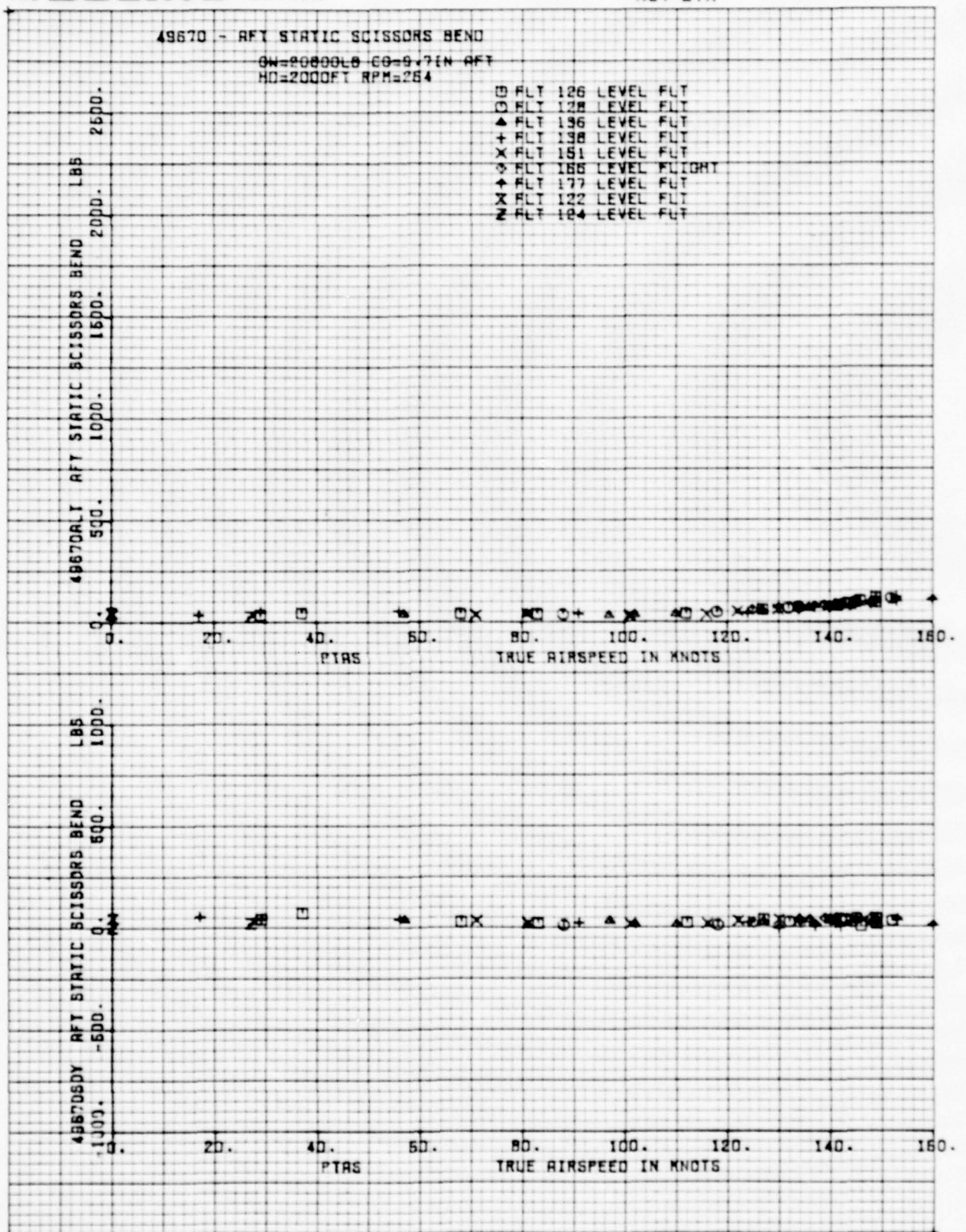
THE **BOEING** COMPANY

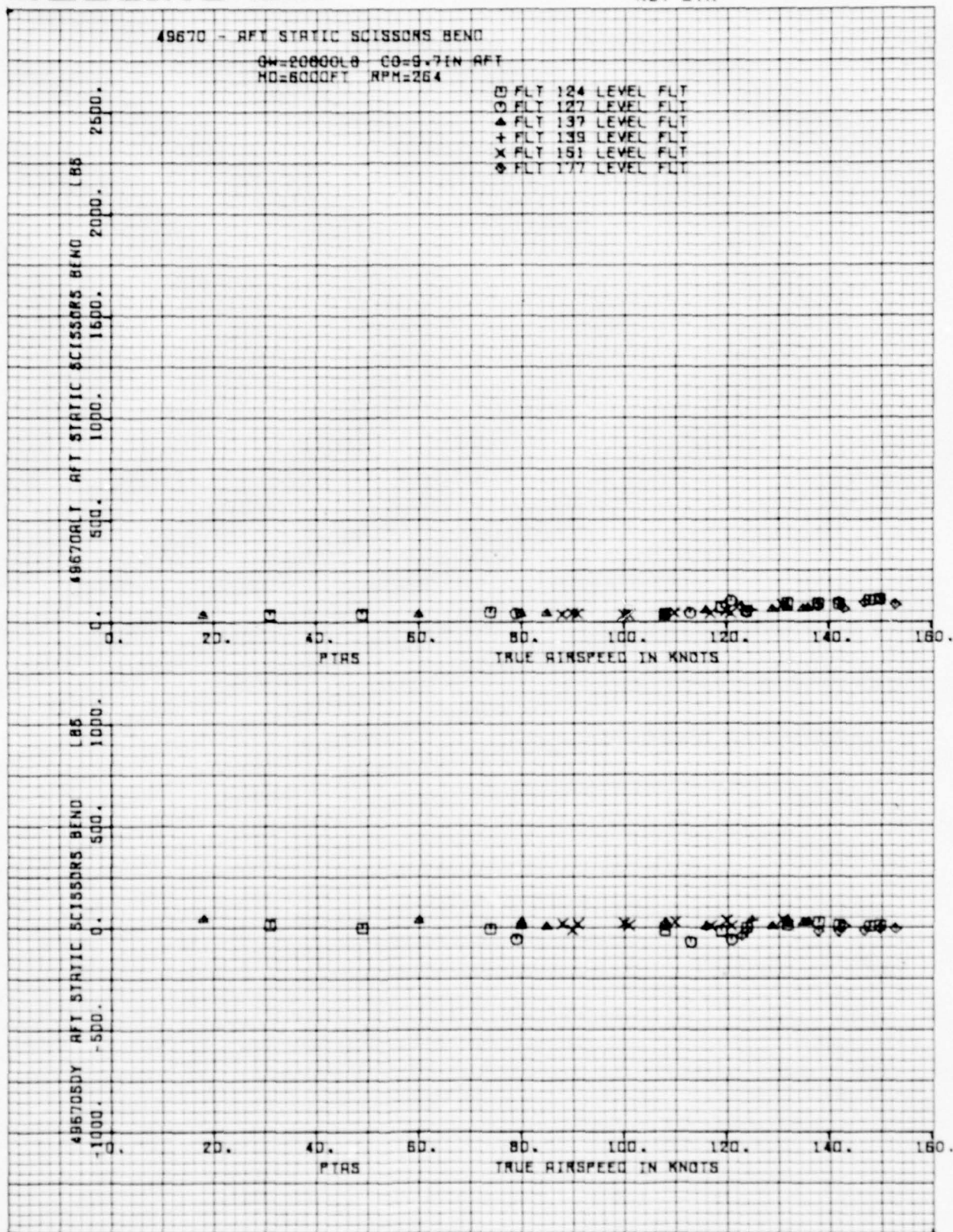
49670 - AFT STATIC SCISSORS BEND

GW=20800LB CG=22.4IN FWD
PARTIAL POWER DESCENTS① PPO S.S. 2000FT
② PPO S.S. >6000FT

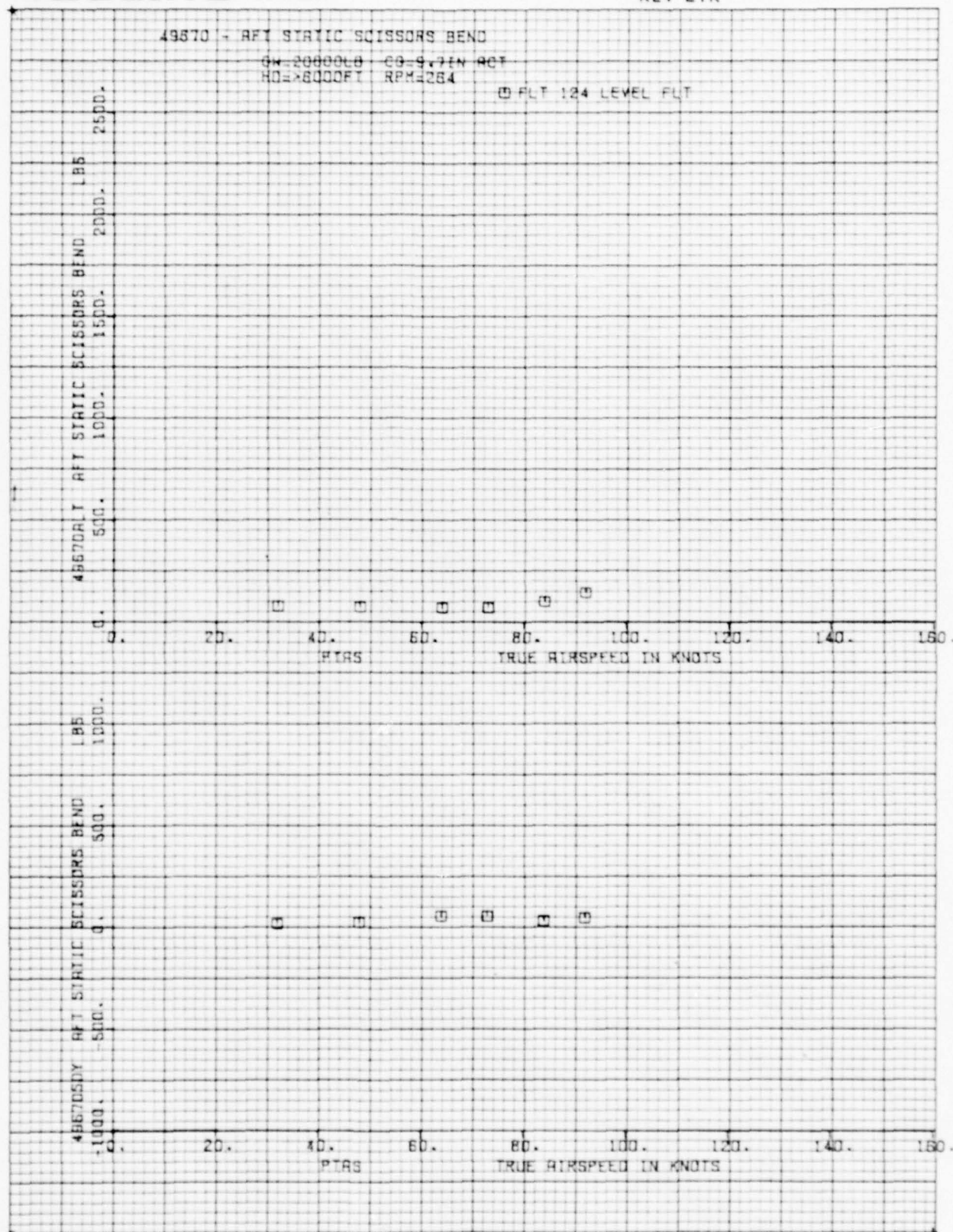
THE **BOEING** COMPANY

FORM 52100-110/111



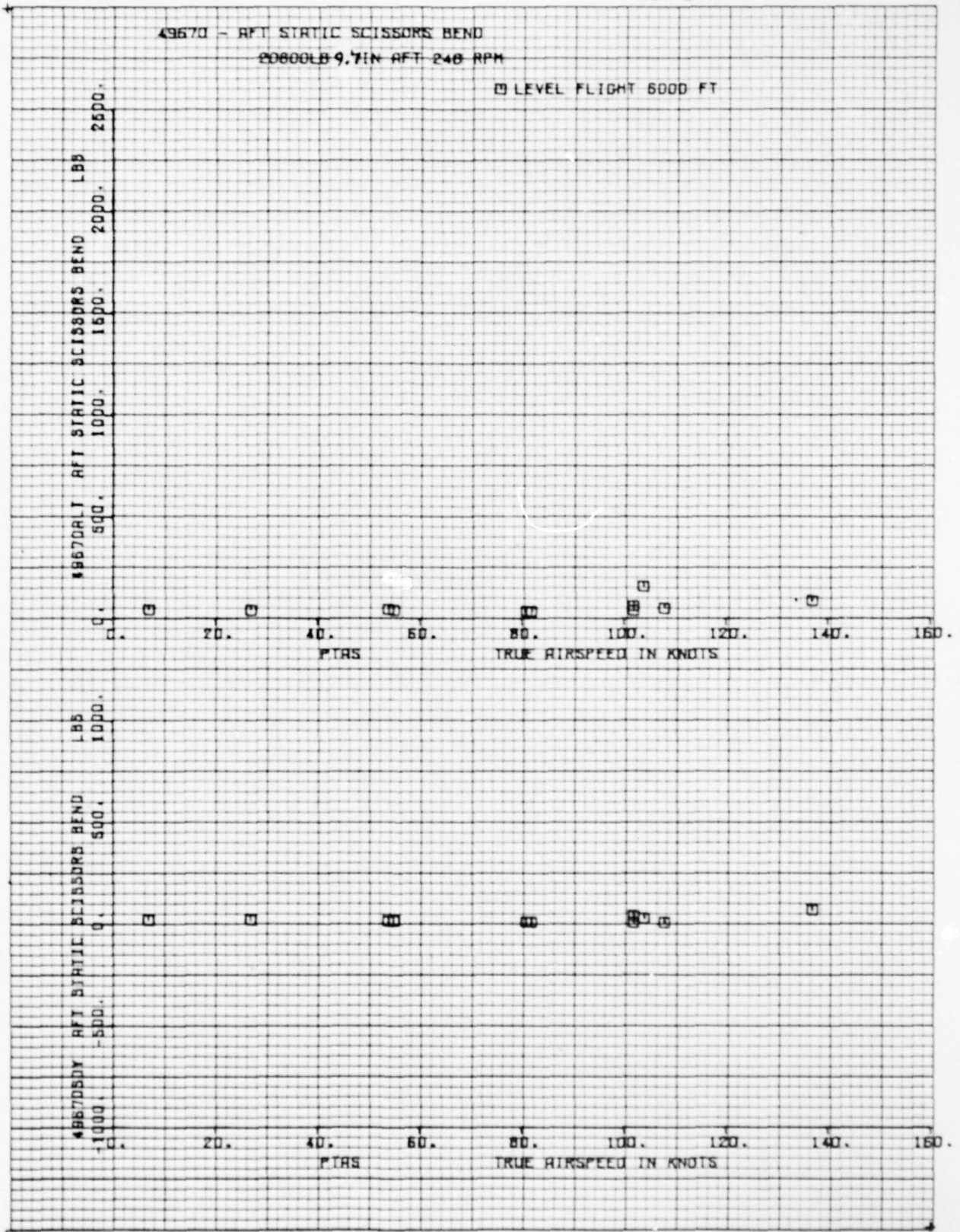


FORM 52300 (10/71)



FORM 82300 (10/71)

THE **BOEING** COMPANY

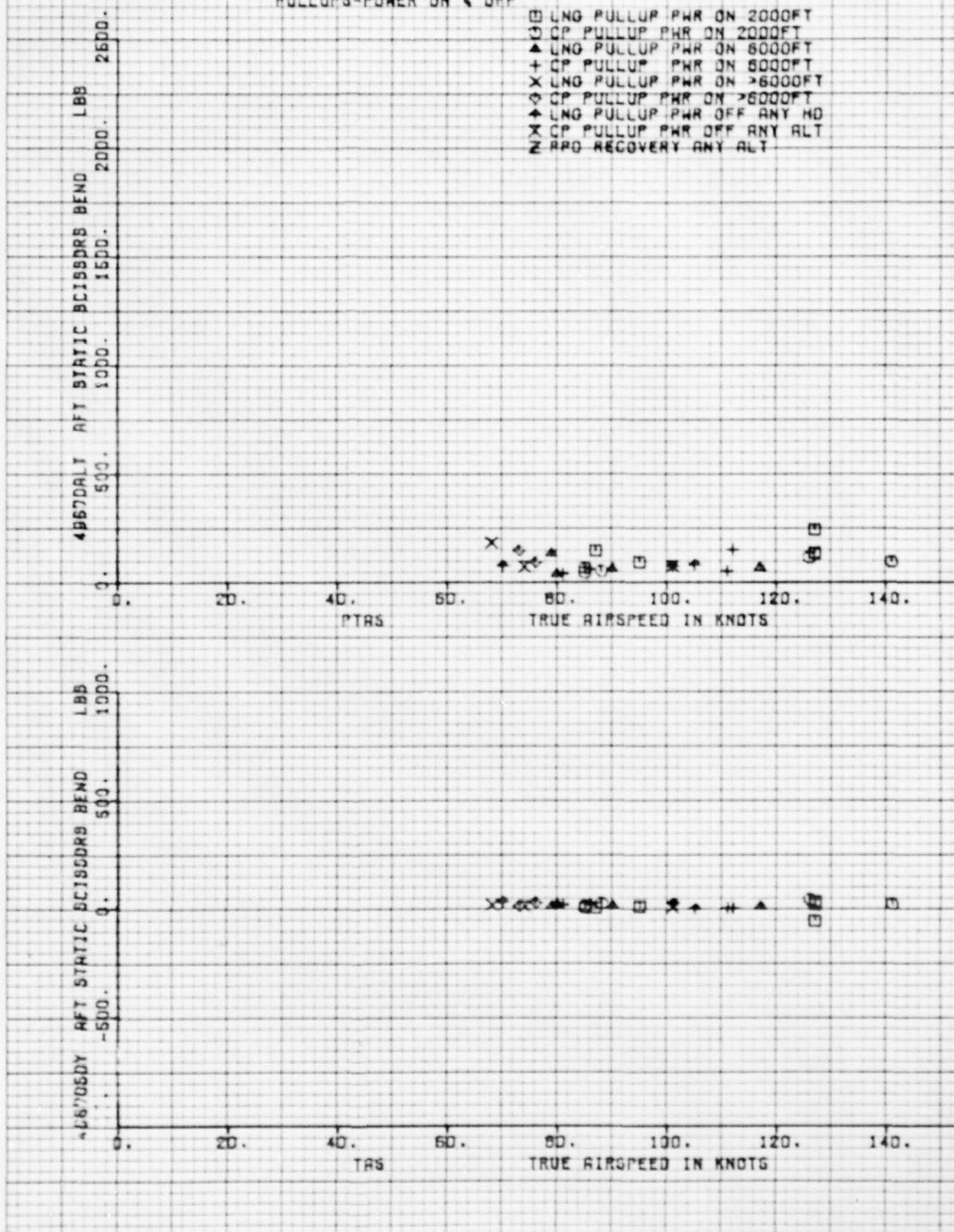


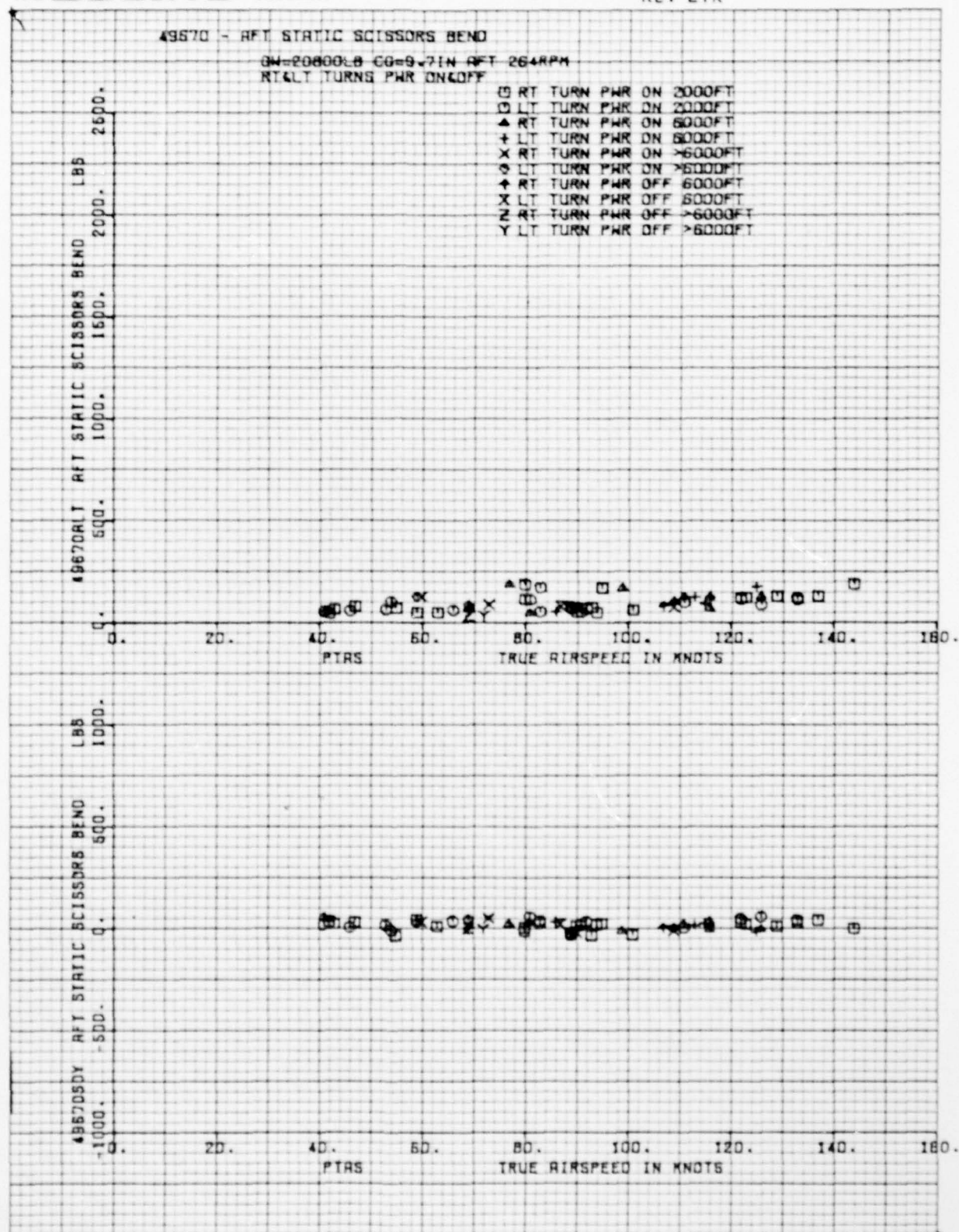
FORM 82300 (10/71)

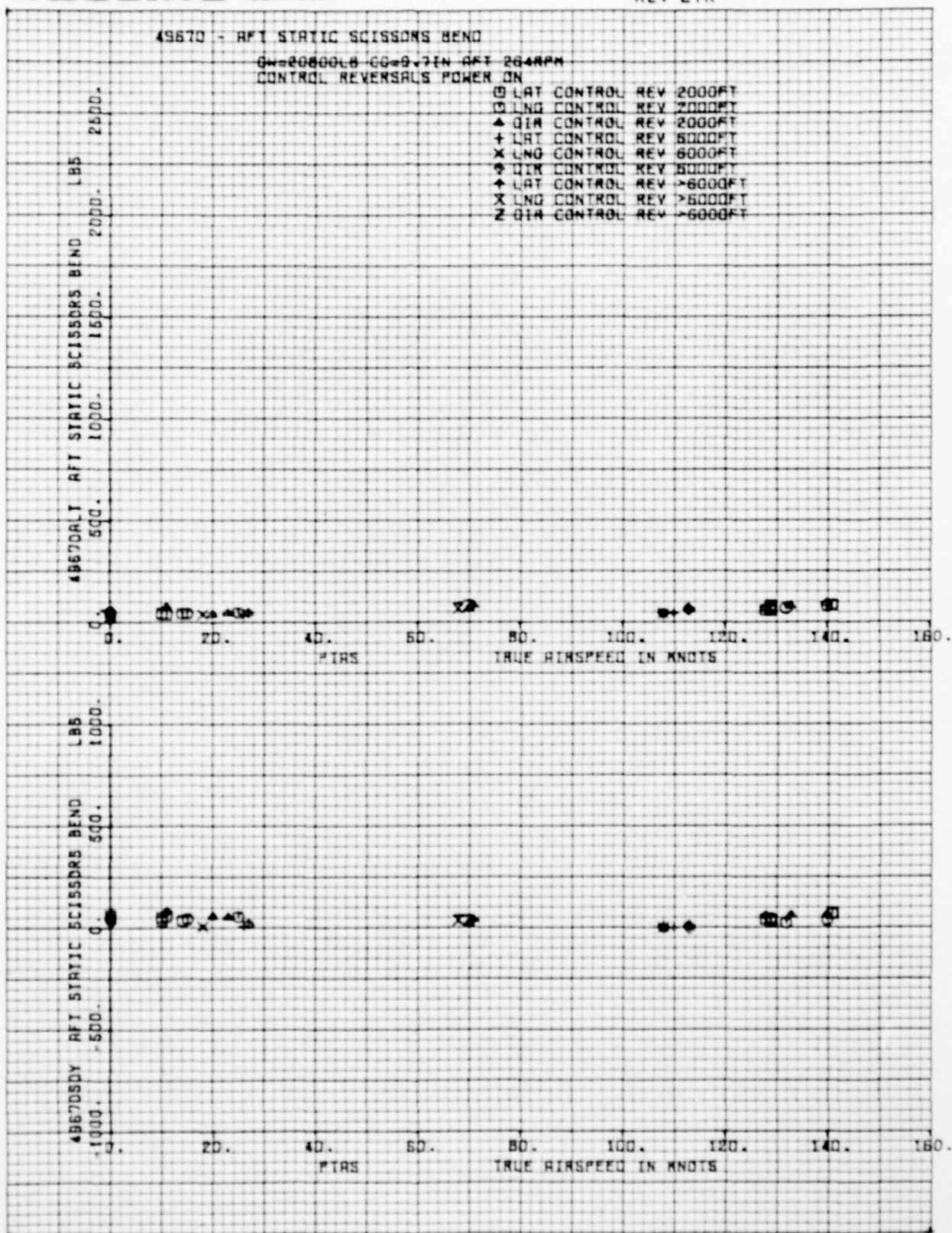
49670 - AFT STATIC SCISSORS BEND

OW-20800LB CO-0.71N AFT 264RDH
PULLUPS-POWER ON & OFF

- LNG PULLUP PWR ON 2000FT
- CP PULLUP PWR ON 2000FT
- ▲ LNG PULLUP PWR ON 6000FT
- + CP PULLUP PWR ON 6000FT
- × LNG PULLUP PWR ON >6000FT
- ◇ CP PULLUP PWR ON >6000FT
- △ LNG PULLUP PWR OFF ANY ALT
- × CP PULLUP PWR OFF ANY ALT
- z APO RECOVERY ANY ALT





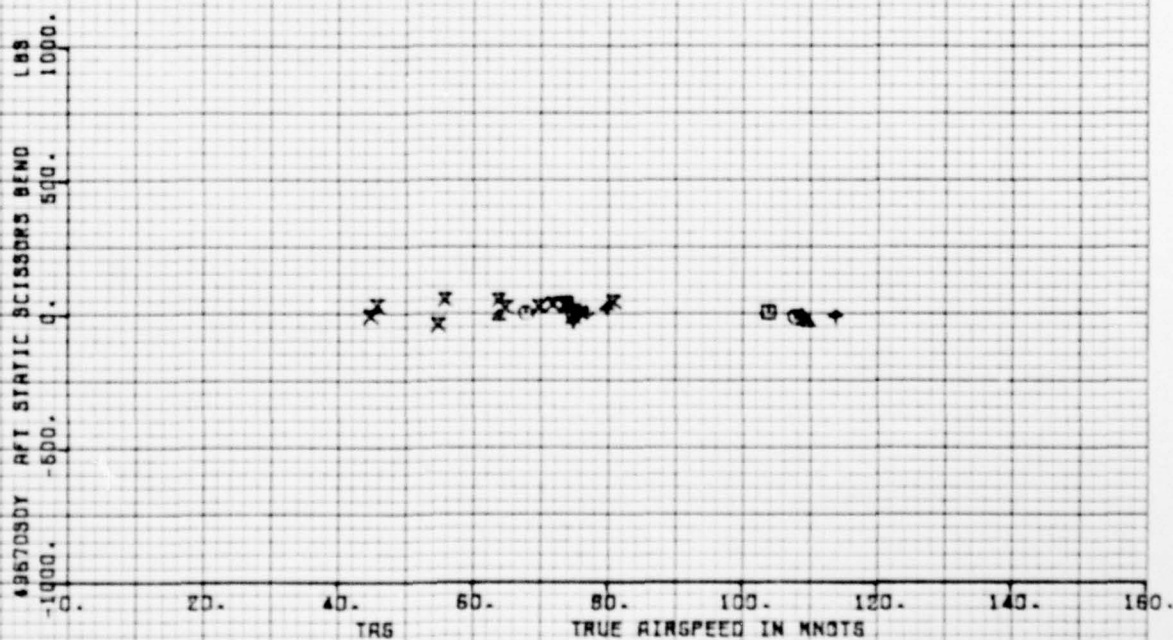
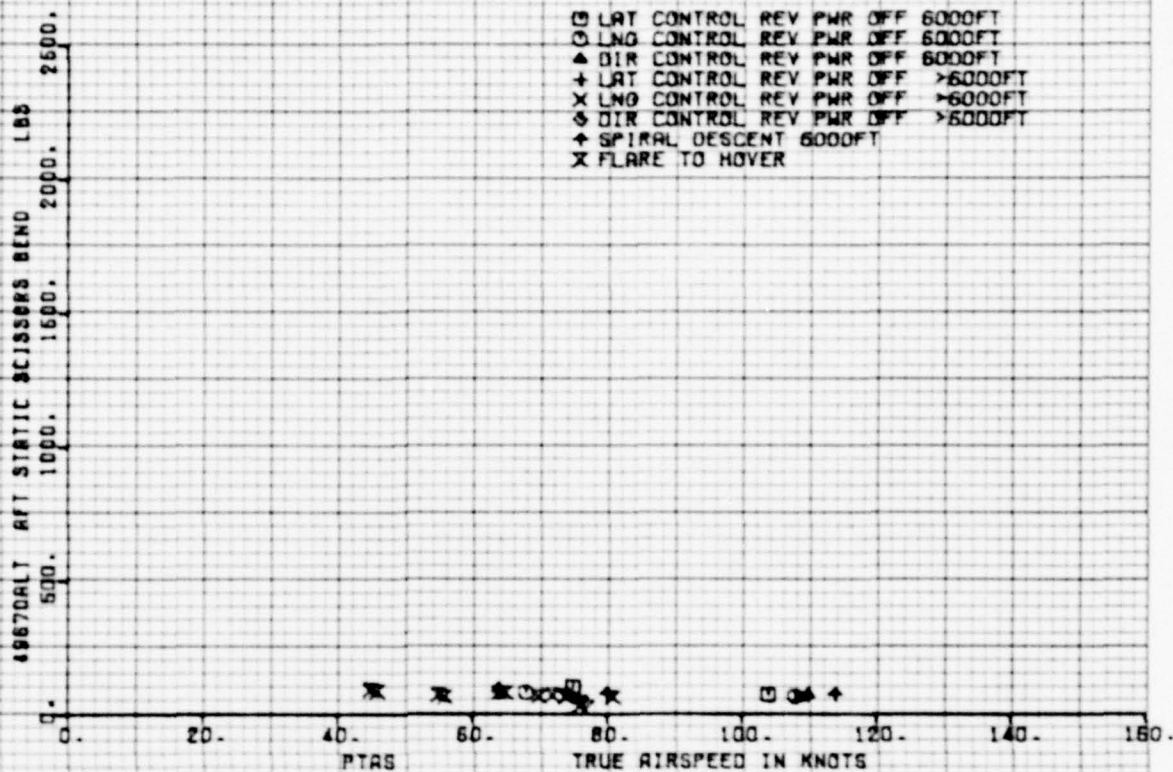


THE **BOEING** COMPANY

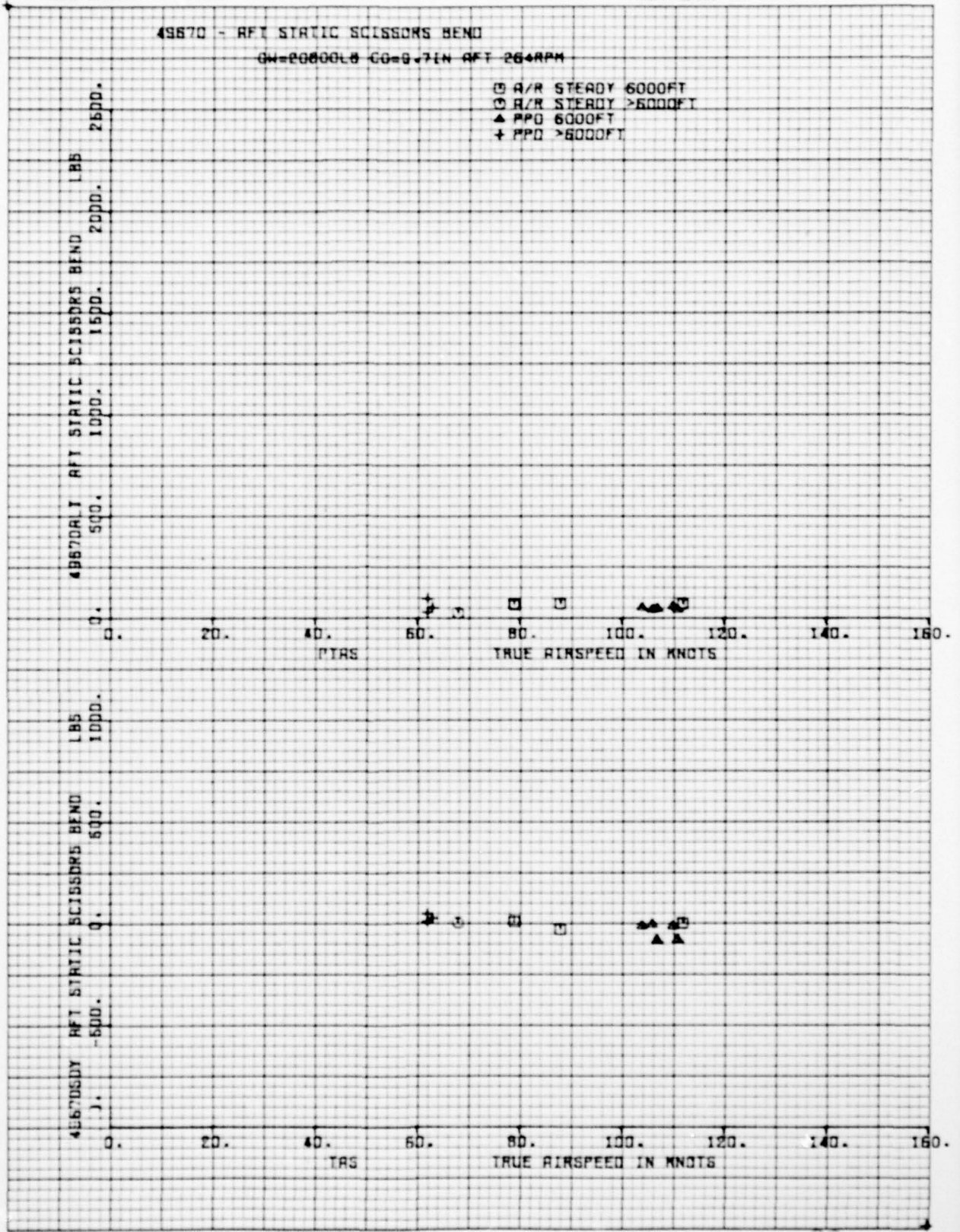
49670 - AFT STATIC SCISSORS BEND

GW=20800LB CD=9.71N WFT 264RPM

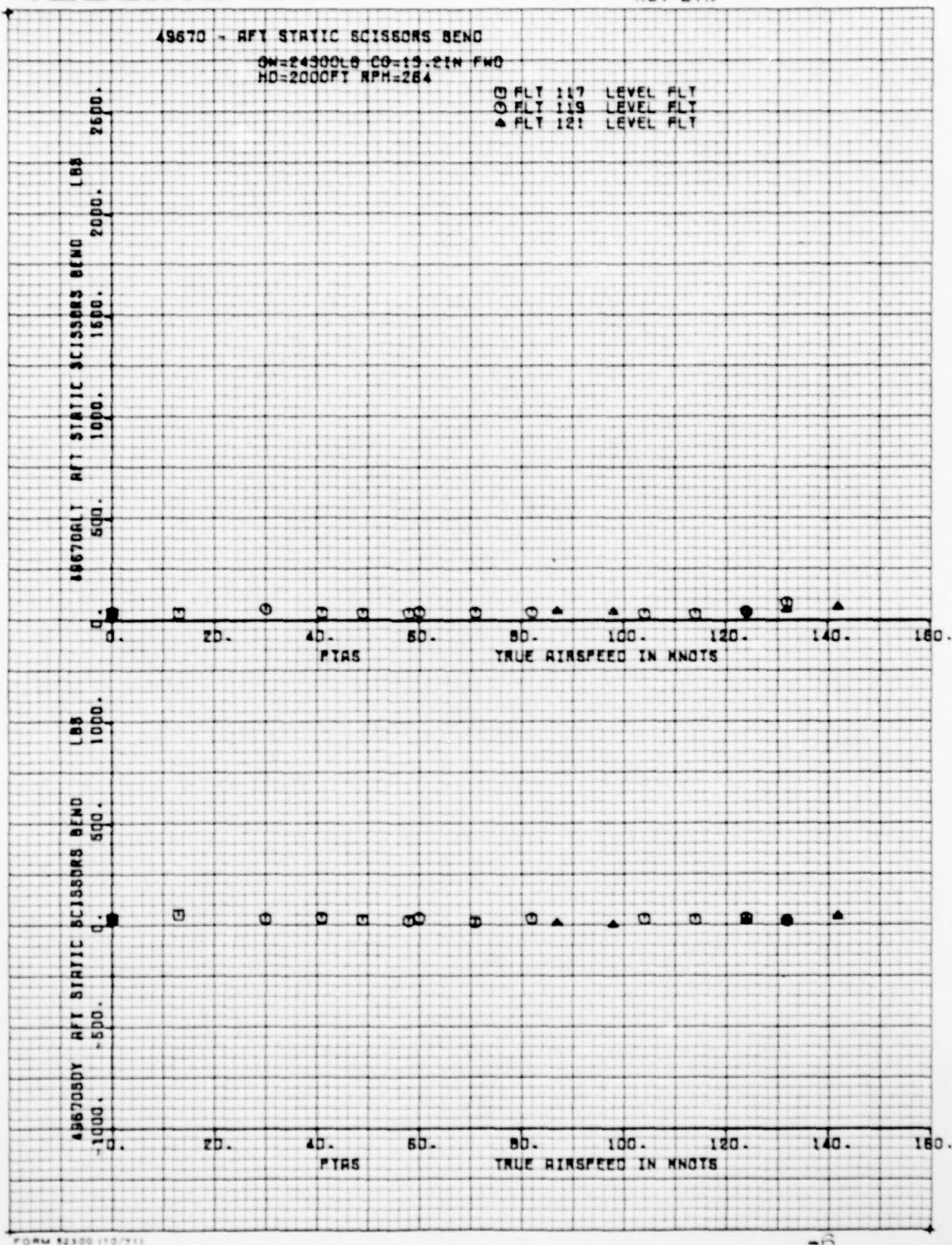
□ LAT CONTROL REV PWR OFF 6000FT
 ○ LNG CONTROL REV PWR OFF 6000FT
 ▲ DIR CONTROL REV PWR OFF 6000FT
 + LAT CONTROL REV PWR OFF >6000FT
 × LNG CONTROL REV PWR OFF >6000FT
 \$ DIR CONTROL REV PWR OFF >6000FT
 + SPIRAL DESCENT 6000FT
 × FLARE TO HOVER

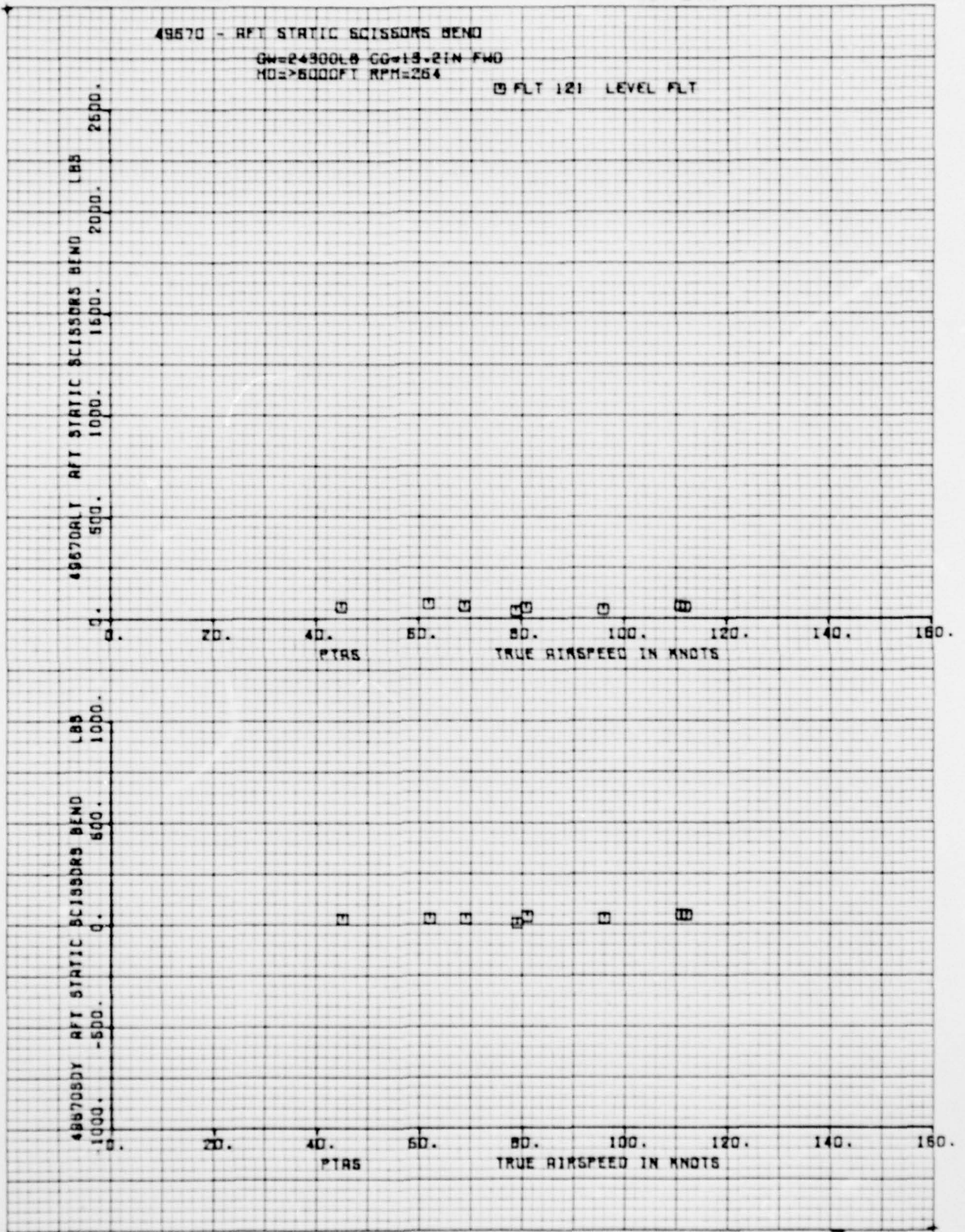


THE **BOEING** COMPANY

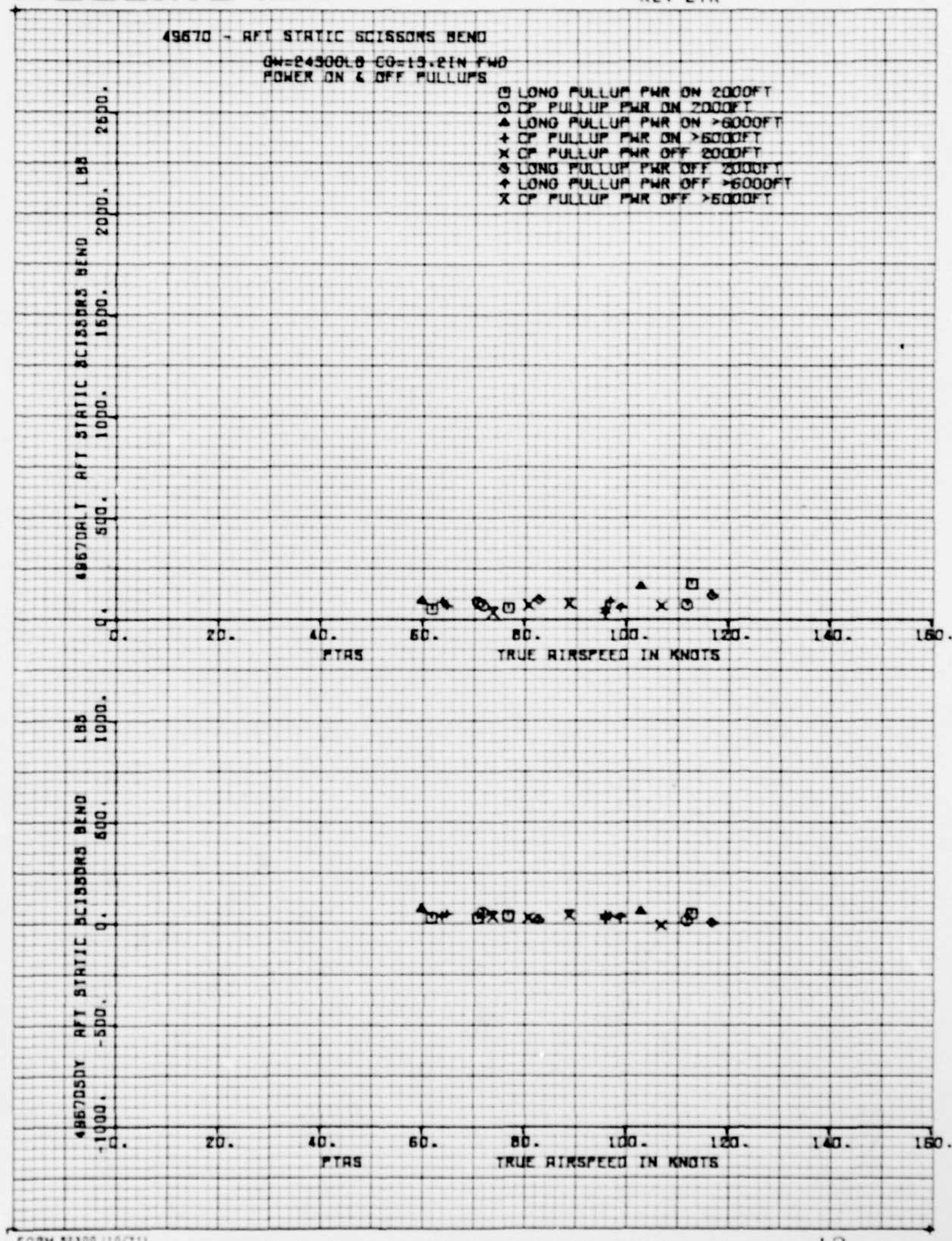


FORM 52300 (10/71)





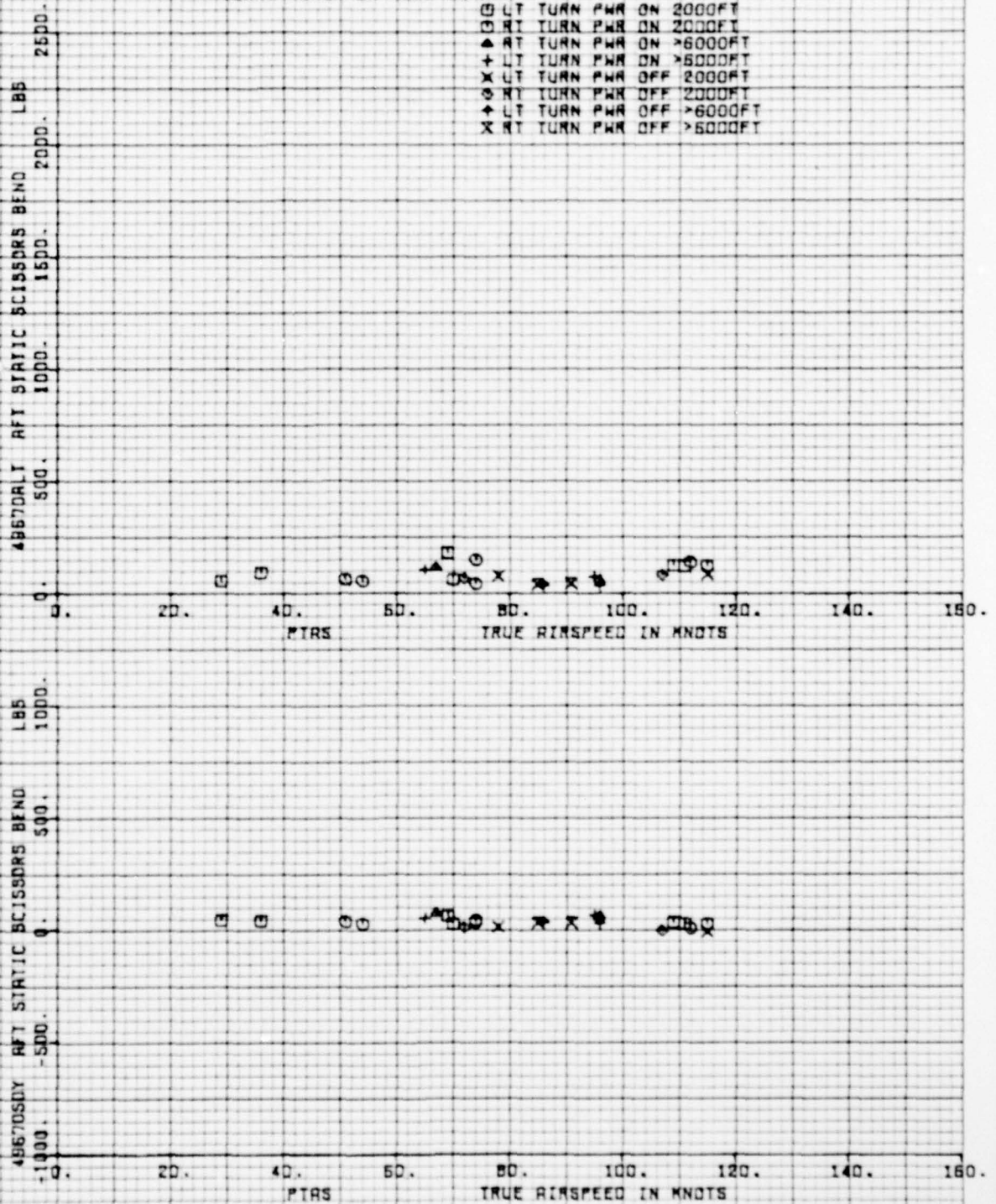
FORM 52300 (10/71)

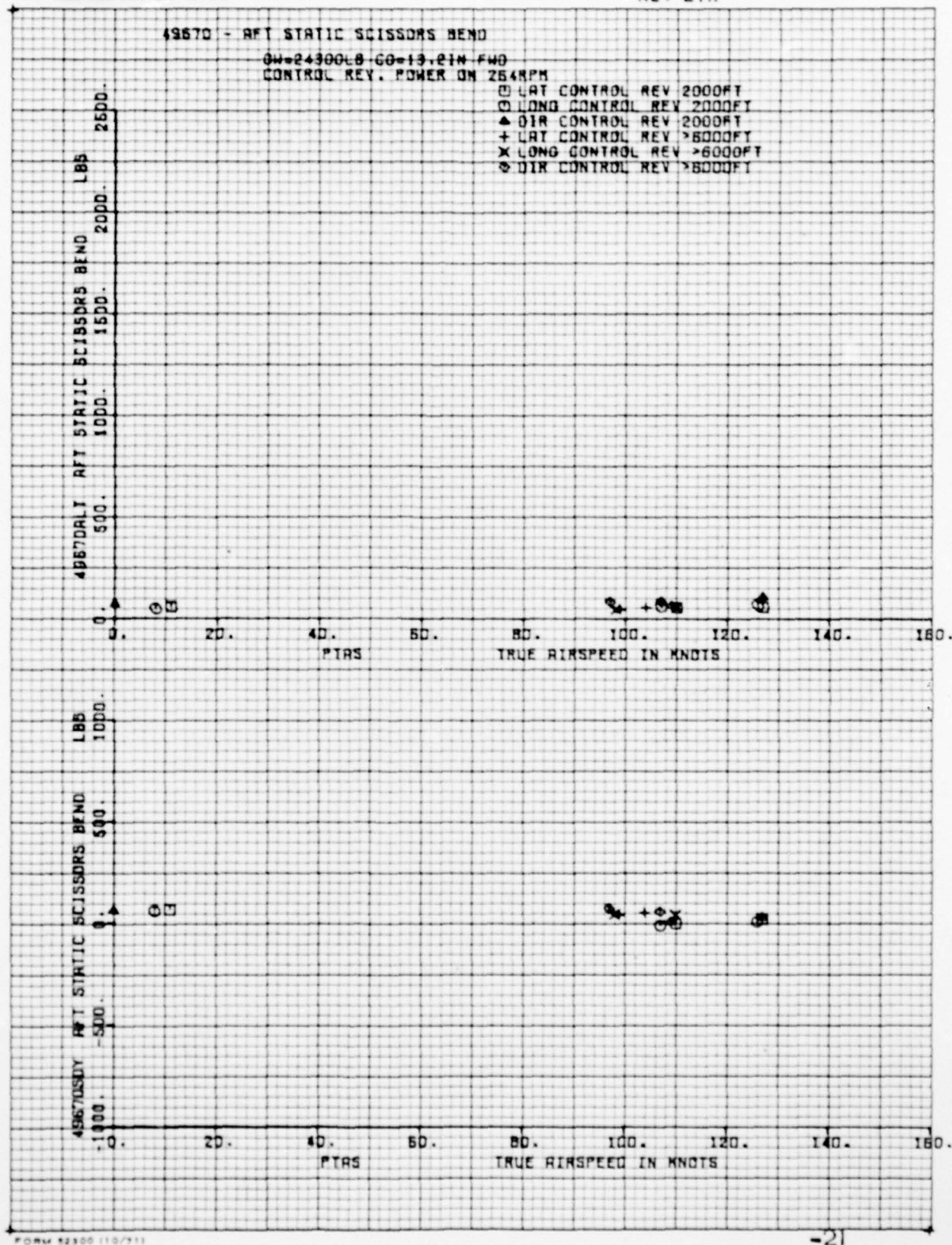


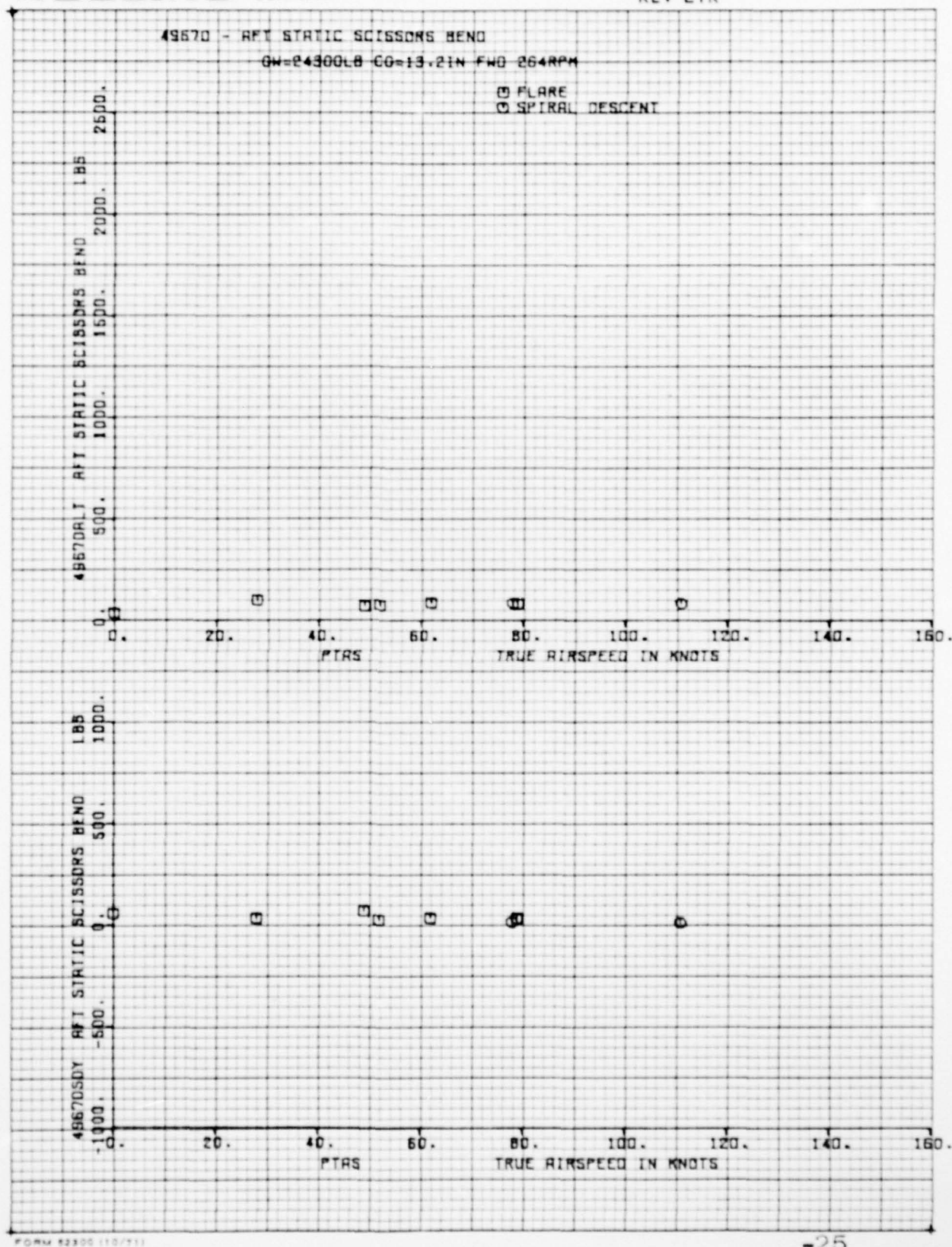
49670 - RPT STATIC SCISSORS BEND

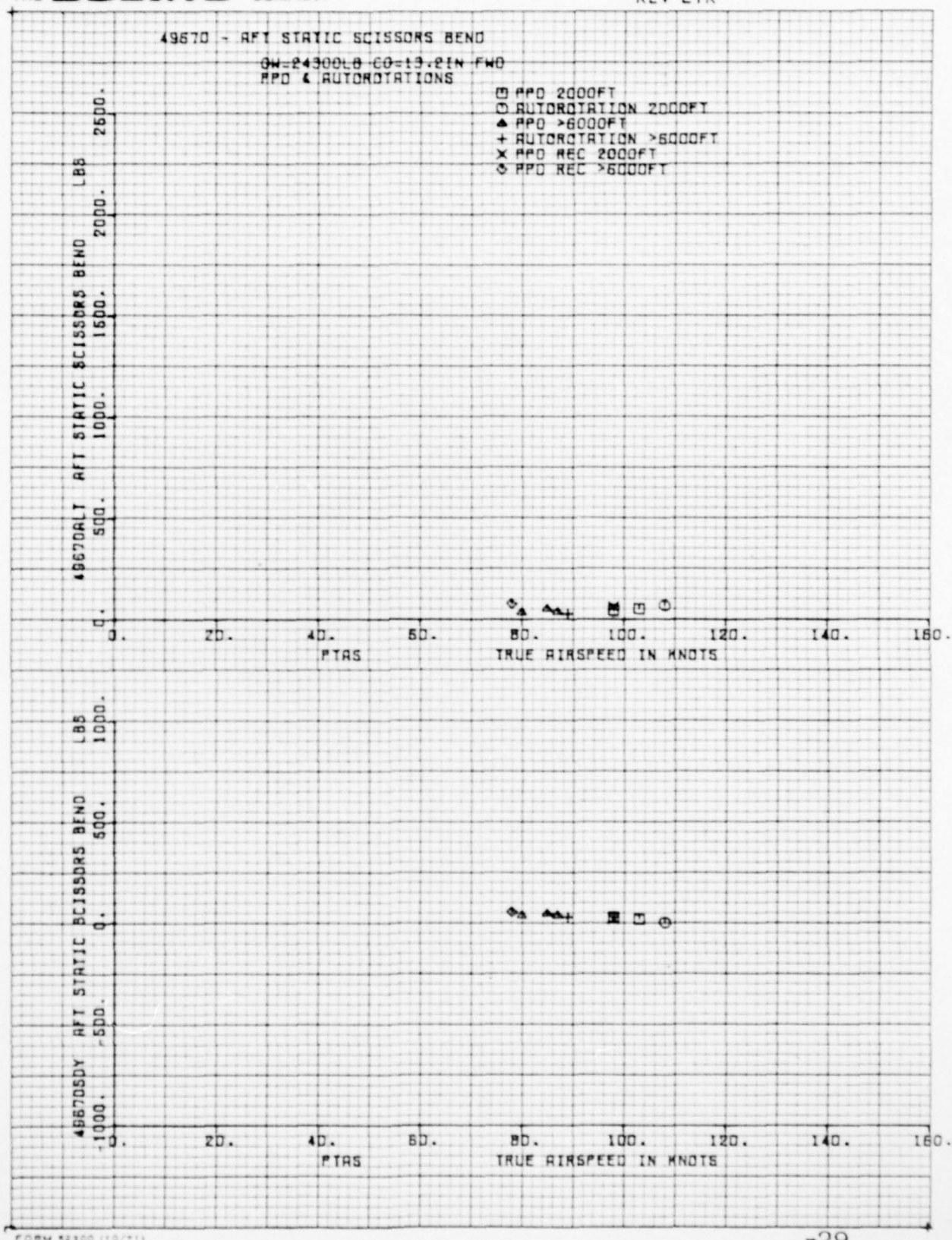
GW=24300LB GO=13.2IN FWD
TURNS POWER ON 40FF 264RPM

- ⊖ LT TURN PWR ON 2000FT
- ⊖ RT TURN PWR ON 2000FT
- ▲ RT TURN PWR ON >6000FT
- + LT TURN PWR ON >6000FT
- × LT TURN PWR OFF 2000FT
- ⊖ RT TURN PWR OFF 2000FT
- + LT TURN PWR OFF >6000FT
- × RT TURN PWR OFF >6000FT

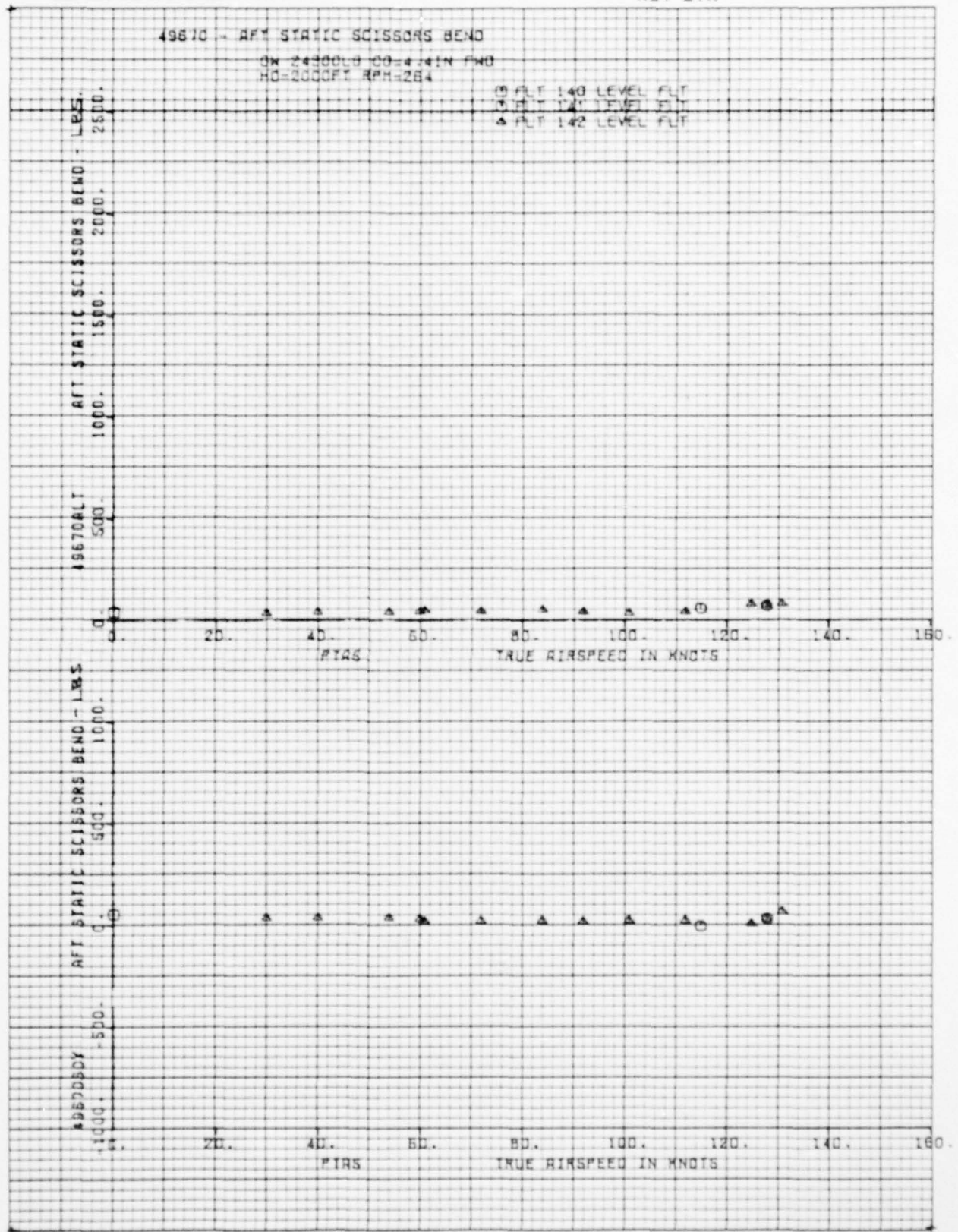






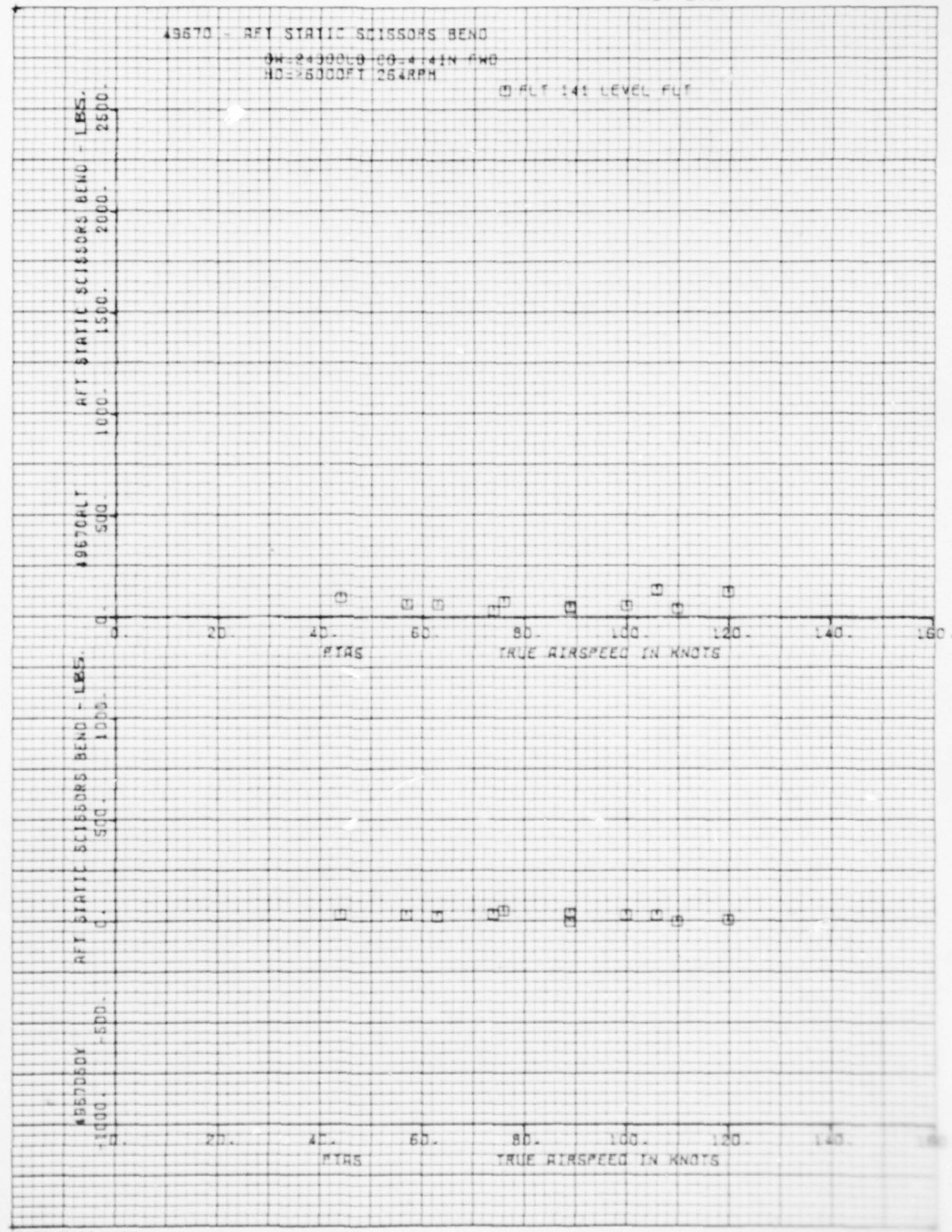
THE **BOEING** COMPANY

FORM 52300 (10/71)



FORM 82300 (10/71)

THE **BOEING** COMPANY



FORM 82300 (10/71)

AD-A075 616

BOEING VERTOL CO PHILADELPHIA PA

F/G 1/3

CH-46 COMPOSITE ROTOR BLADE FLIGHT STRESS SURVEY DATA. VOLUME V--ETC(U)

1978 R AIELLO, J BENDO

N00019-75-C-0396

UNCLASSIFIED

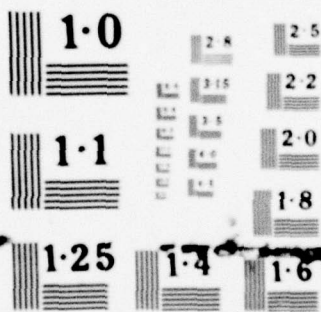
D210-11168-3-VOL-7

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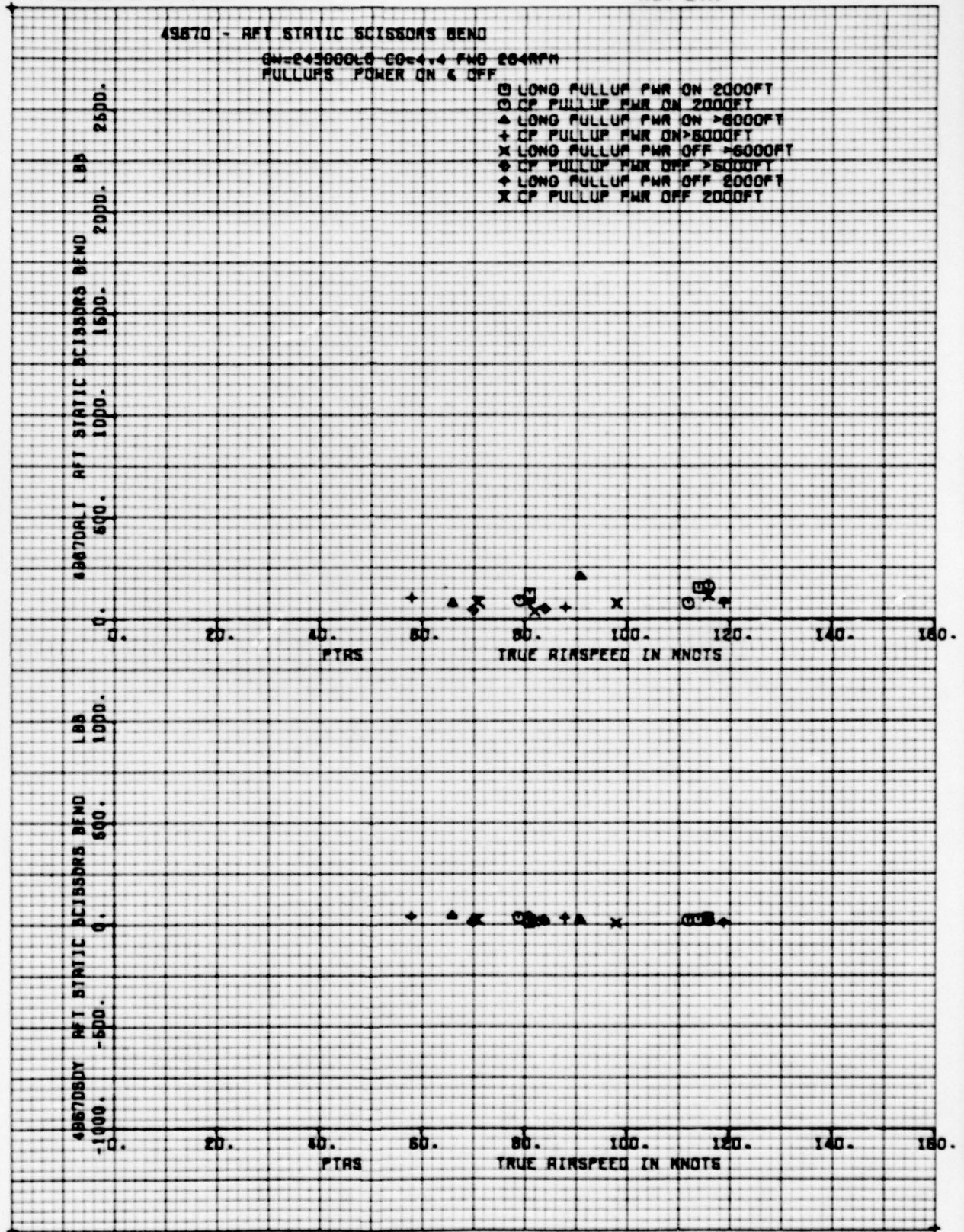
3 OF 4

AD-A075616





NATIONAL BUREAU OF STANDARDS
MICROCOPY RESOLUTION TEST CHART

THE **BOEING** COMPANY

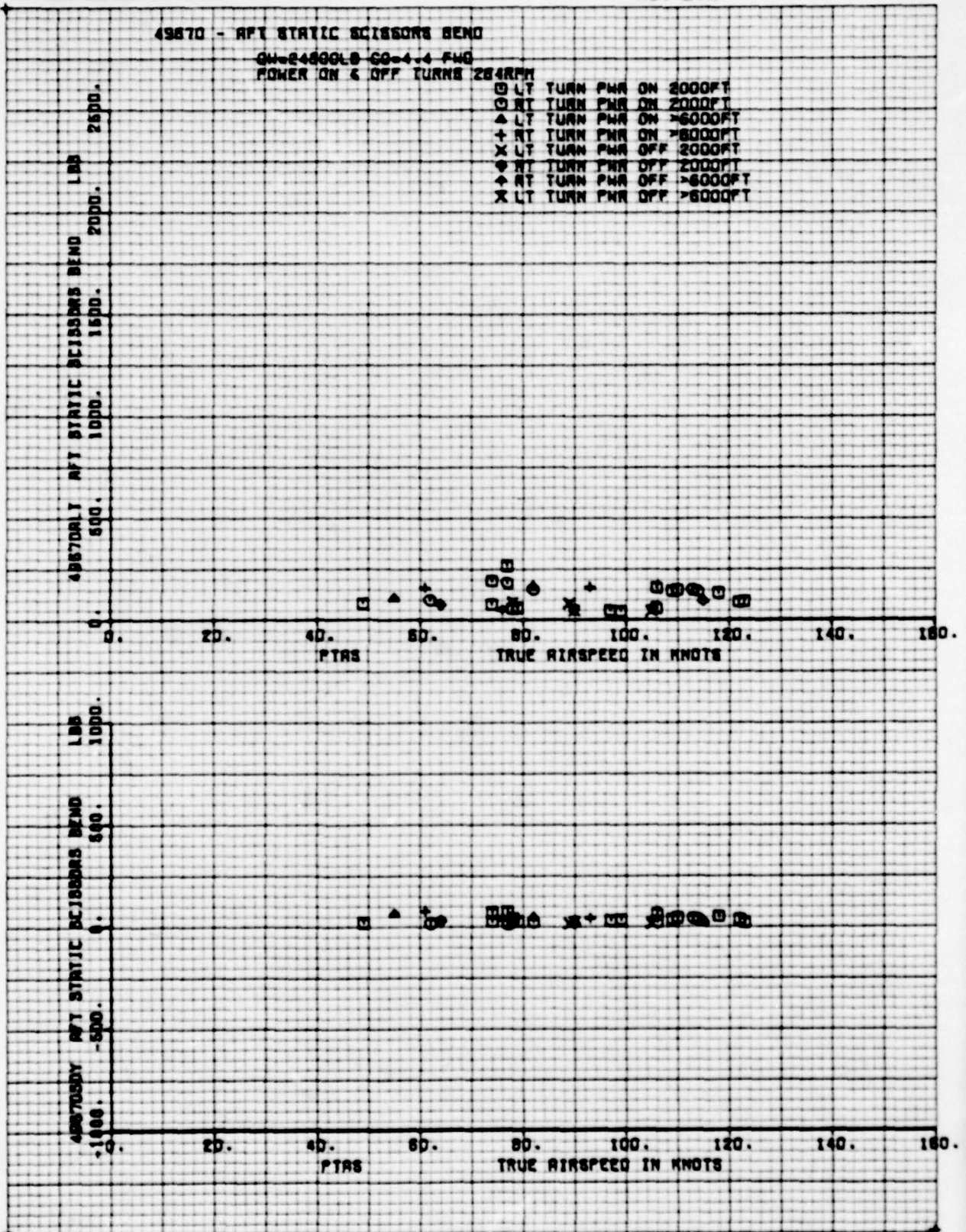
FORM 52300 (10/71)

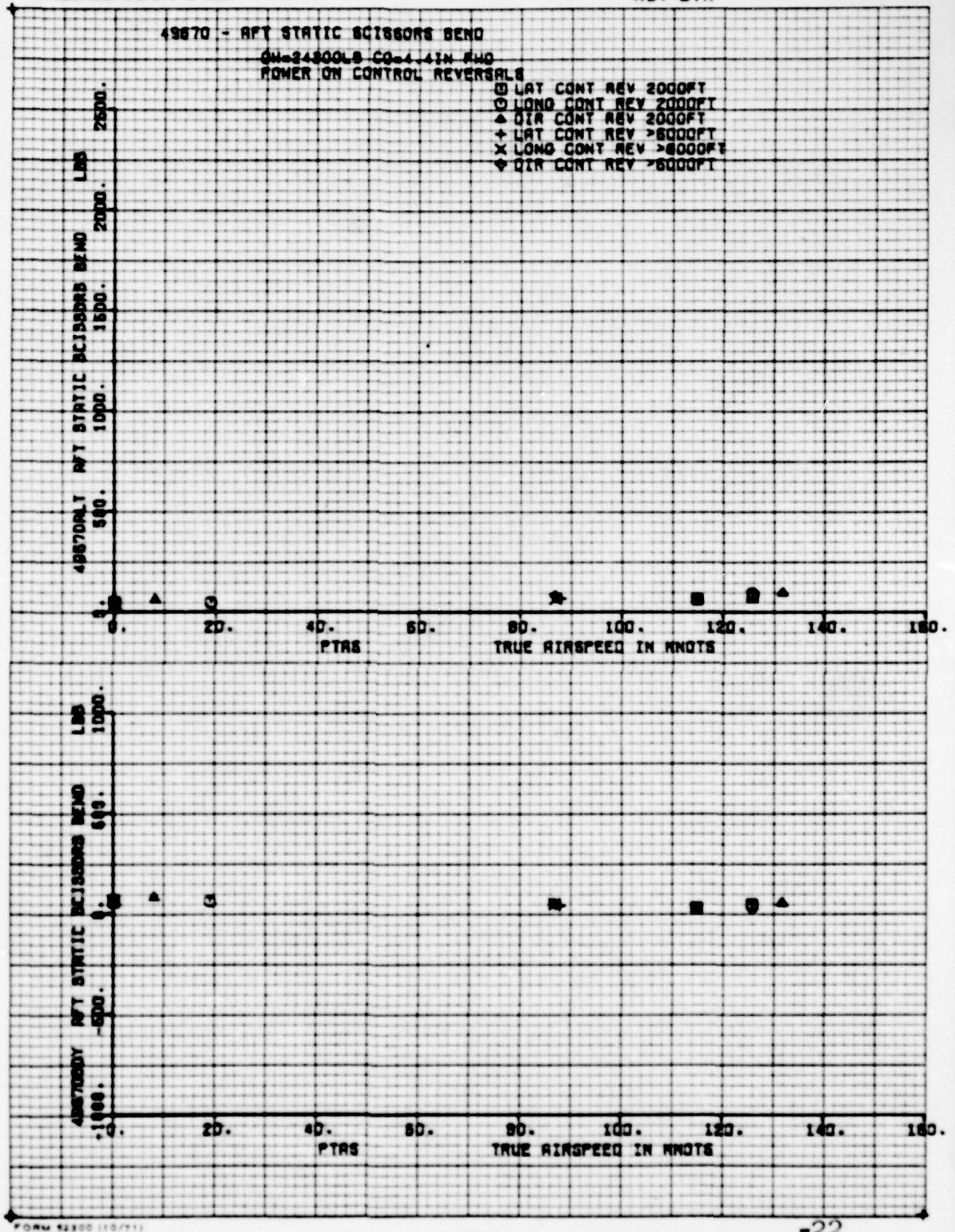
49870 - AFT STATIC SCISSORS BEND

GW-24800LB GS-4.4 FWD

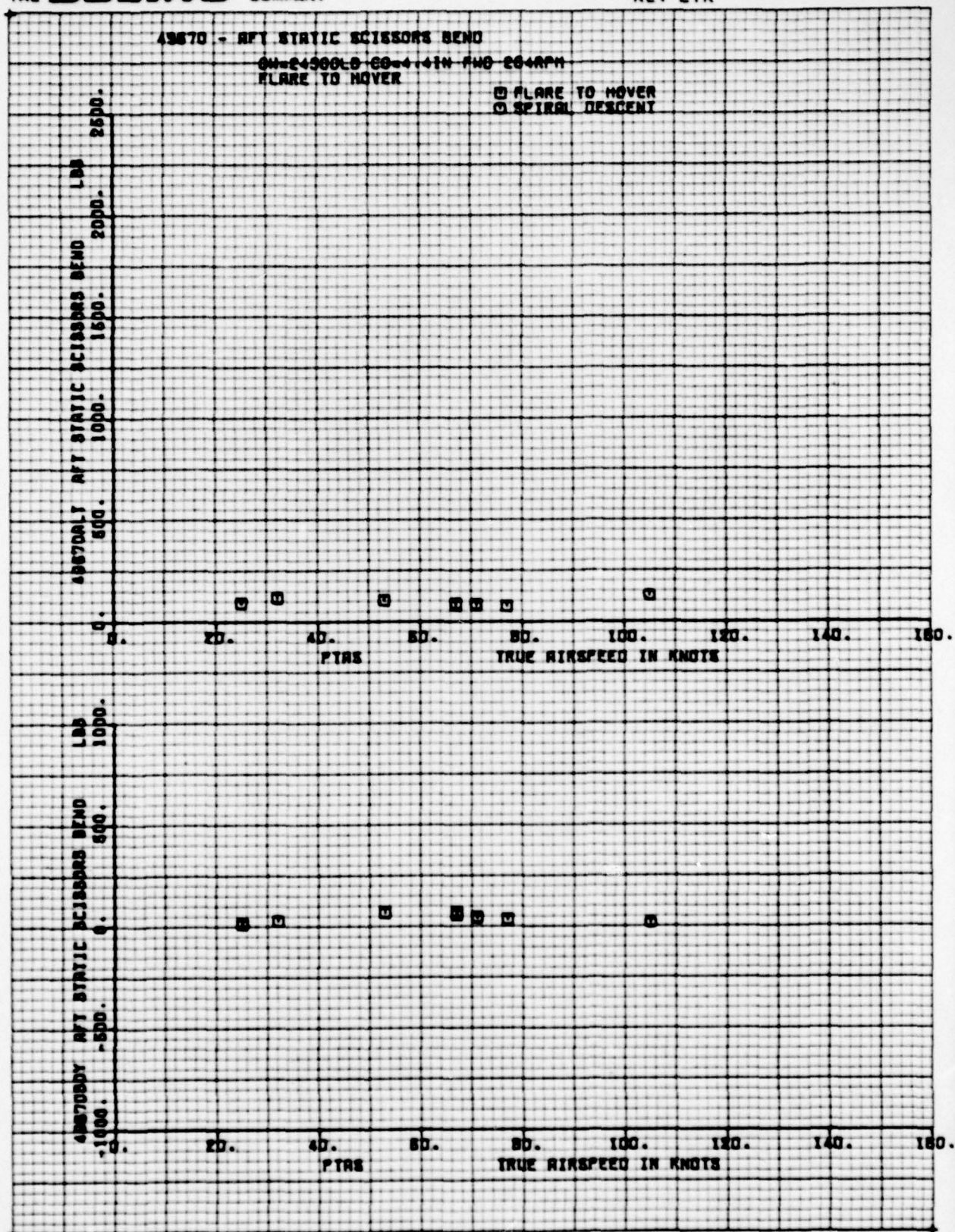
POWER ON & OFF TURN 284RPM

○ LT TURN PWR ON 2000FT
○ RT TURN PWR ON 2000FT
△ LT TURN PWR ON >6000FT
+ RT TURN PWR ON >6000FT
x LT TURN PWR OFF 2000FT
○ RT TURN PWR OFF 2000FT
+ RT TURN PWR OFF >6000FT
x LT TURN PWR OFF >6000FT



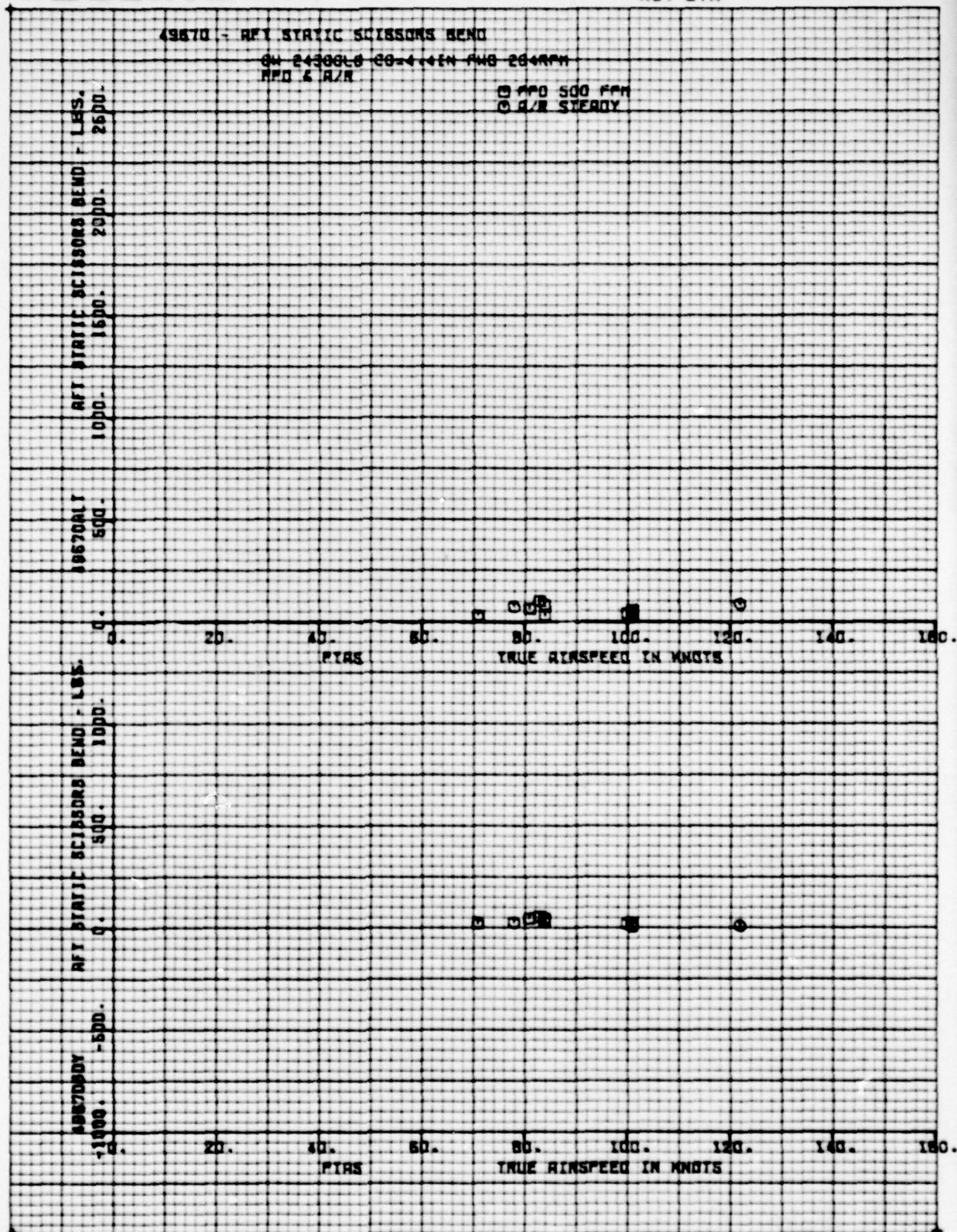


FORM 82800 (10/71)

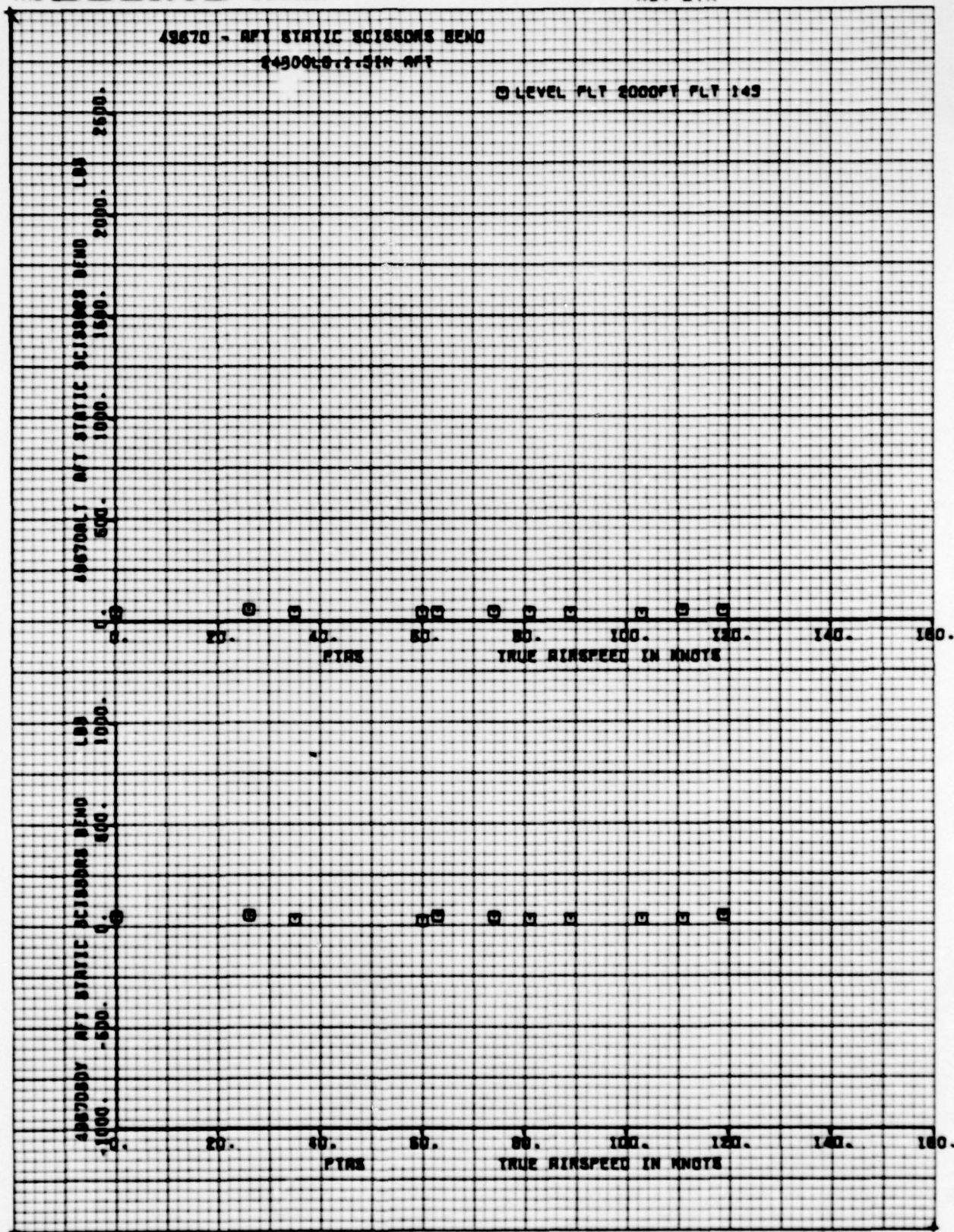
THE **BOEING** COMPANY

FORM 52300 (10/71)

THE **BOEING** COMPANY



FORM 52300 (10/71)



FORM 52300 (110/71)

THE **BOEING** COMPANY

PREPARED BY: J. Bendo

CHECKED BY:

DATE: 8/28/78

NUMBER D210-11168-3

REV LTR Volume 7

MODEL NO.

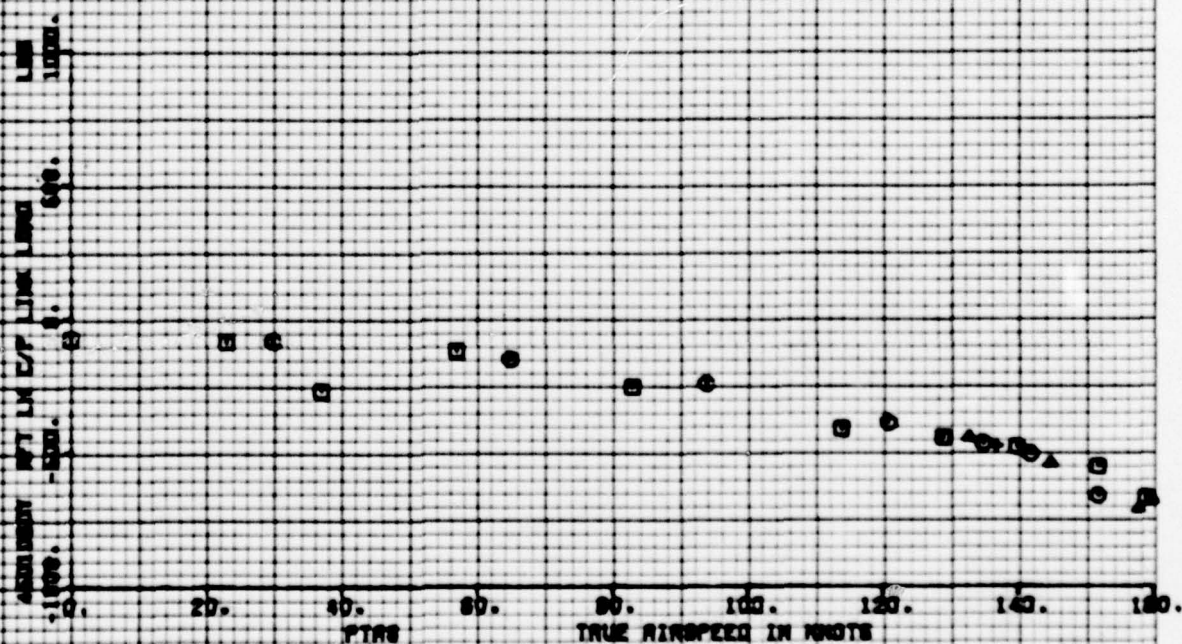
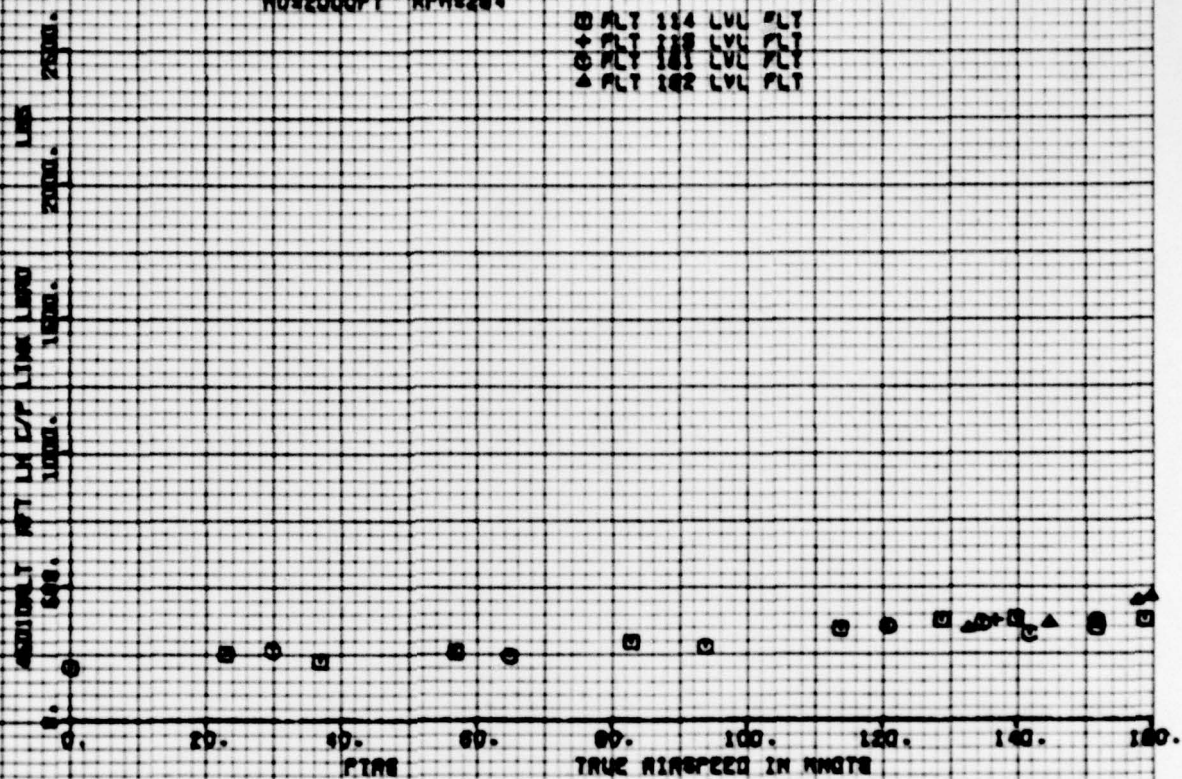
4.6 Aft L.H. C/P Link

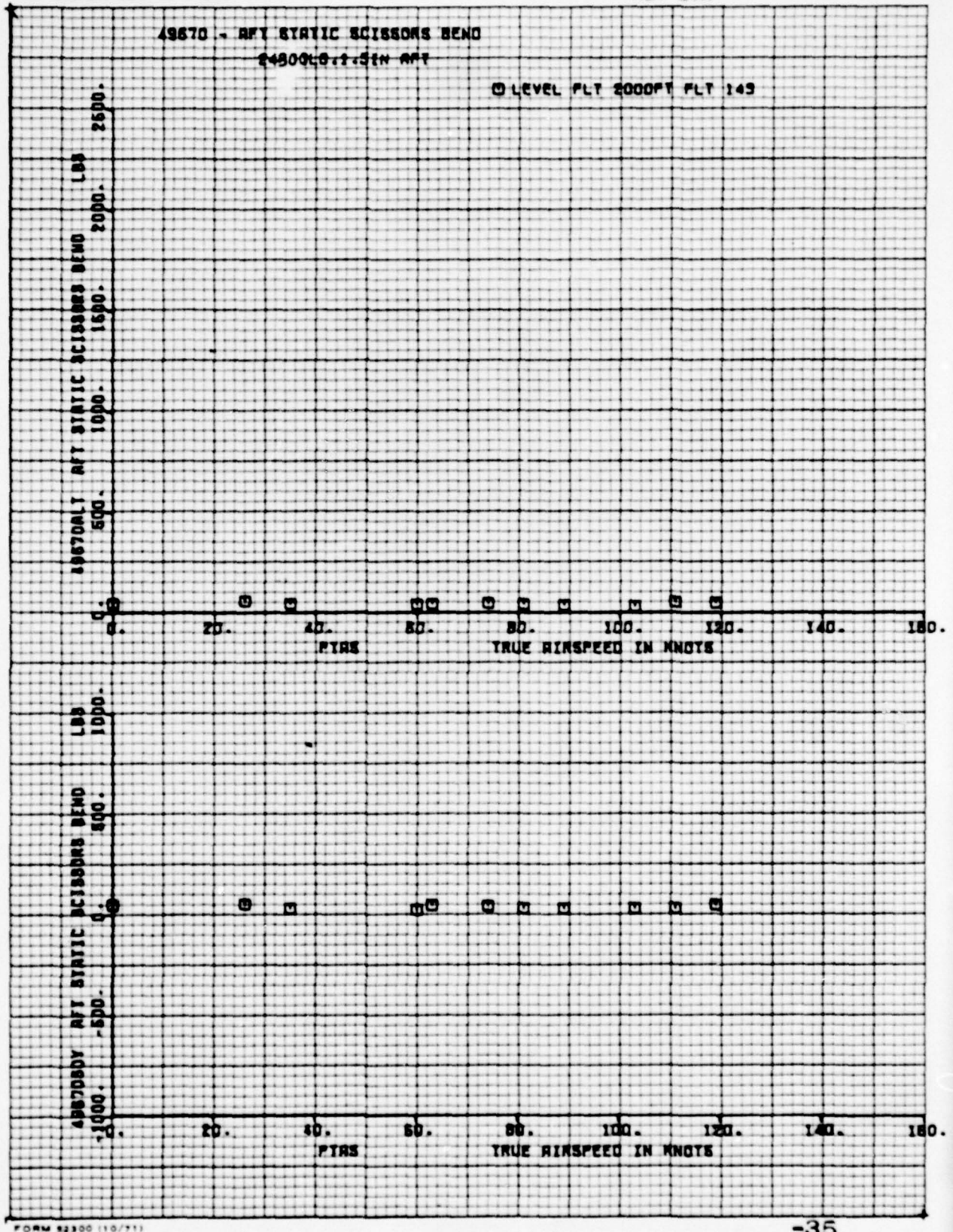
THE **BOEING** COMPANY

48010 - APT LN C/P LHM LQRO

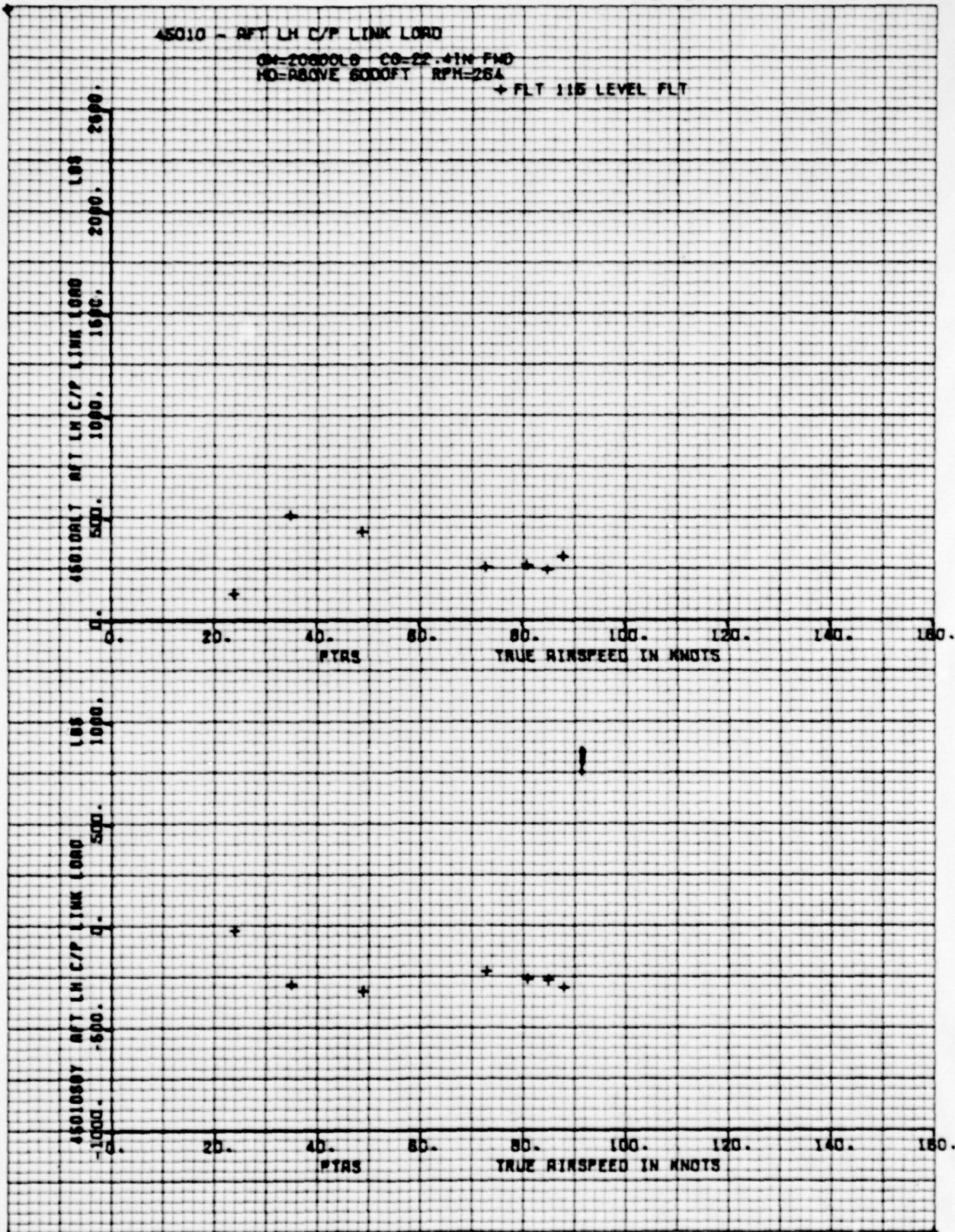
CN=20500LB CO=25.4IN FNO
NO=2000FT RPM=284

□	ALT	114	LVL	FLY
+	ALT	118	LVL	FLY
○	ALT	121	LVL	FLY
△	ALT	122	LVL	FLY





FORM 52300 (10/71)



FORM 82500 (10/71)

45010 - REF LH C/P LINK LOAD

QW-2080048 CG-23-41N FWD RPM-284

① GP PULLUP PWR ON >6000FT
② LNO PULLUP PWR ON >6000FT
▲ GP PULLUP PWR ON 2000FT
+ LNO PULLUP PWR ON 2000FT
X LNO PULLUP PWR OFF 2000FT
◇ GP PULLUP PWR OFF 2000FT
▲ RPQ RECOVERY >6000FT
X RPQ RECOVERY 2000FT

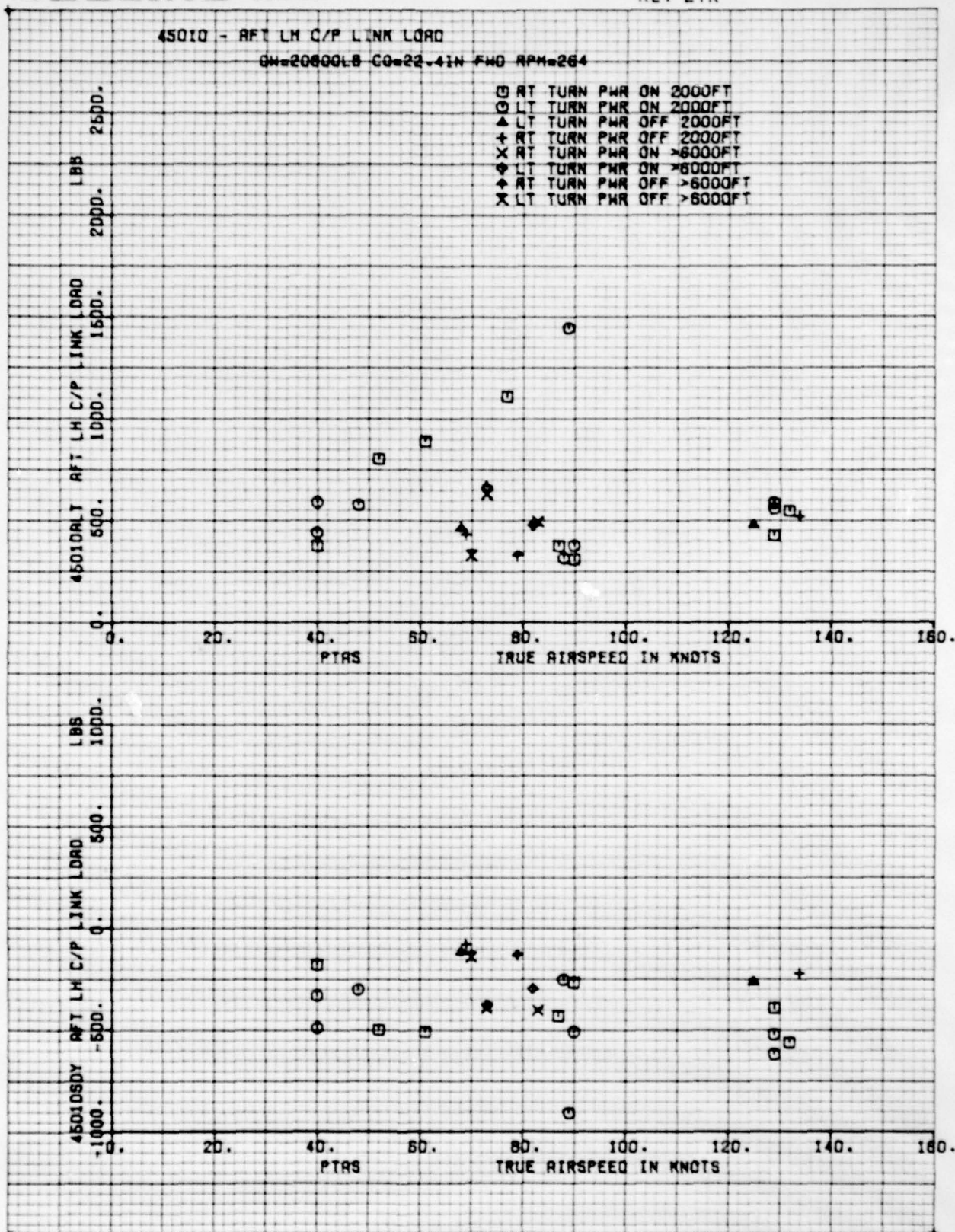
LB 2500.
2000.
1500.
1000.
500.
0.
-500.
-1000.

45010 REF LH C/P LINK LOAD
LB 1000.
500.
0.
-500.
-1000.

20. 40. 60. 80. 100. 120. 140. 160.
KTS TRUE AIRSPEED IN KNOTS

20. 40. 60. 80. 100. 120. 140. 160.
KTS TRUE AIRSPEED IN KNOTS

FORM 52100 11-67-11

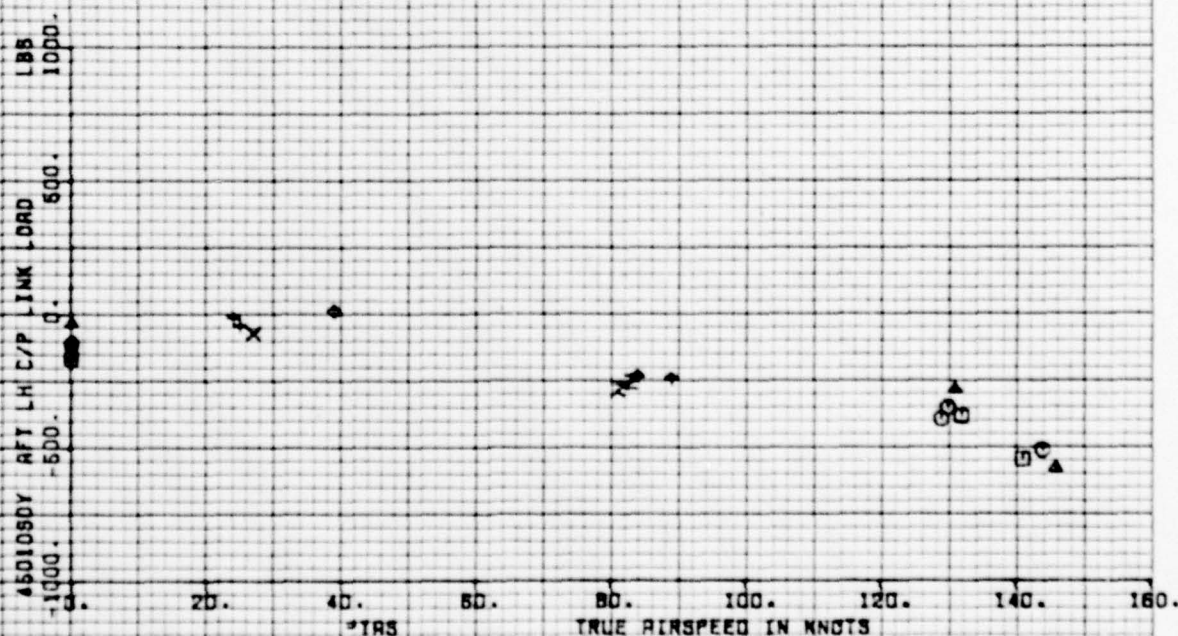
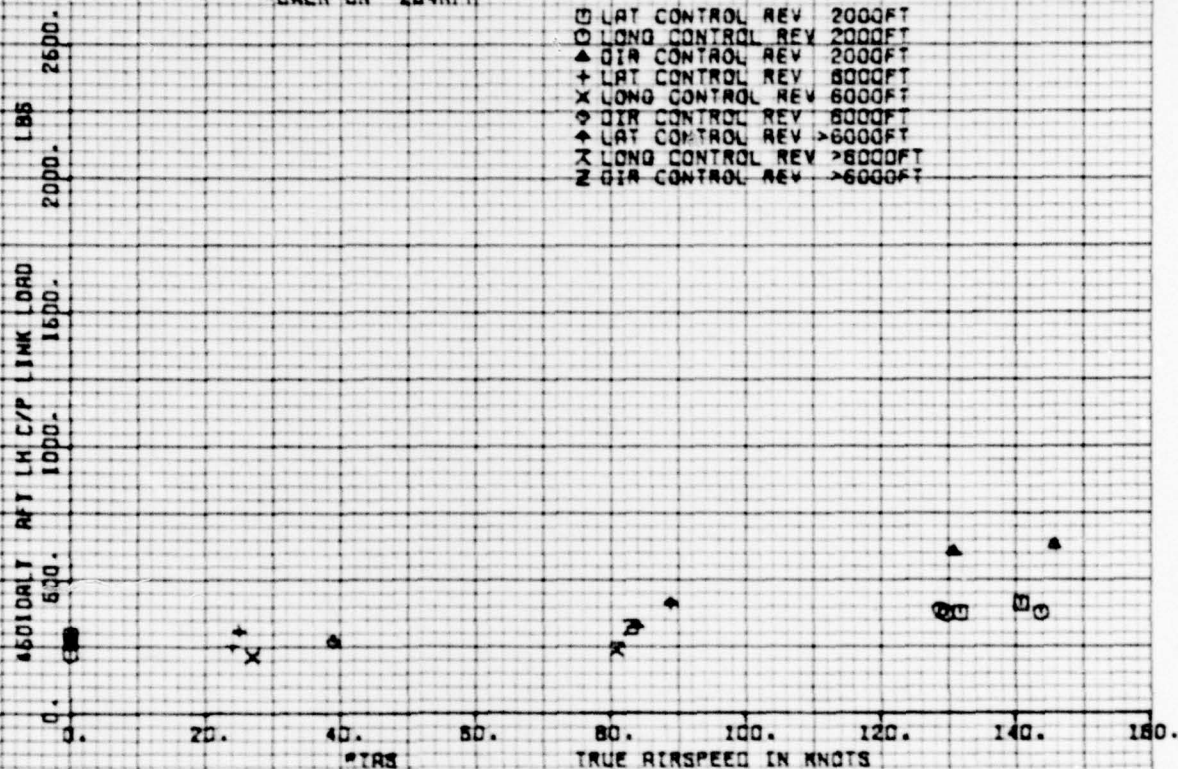


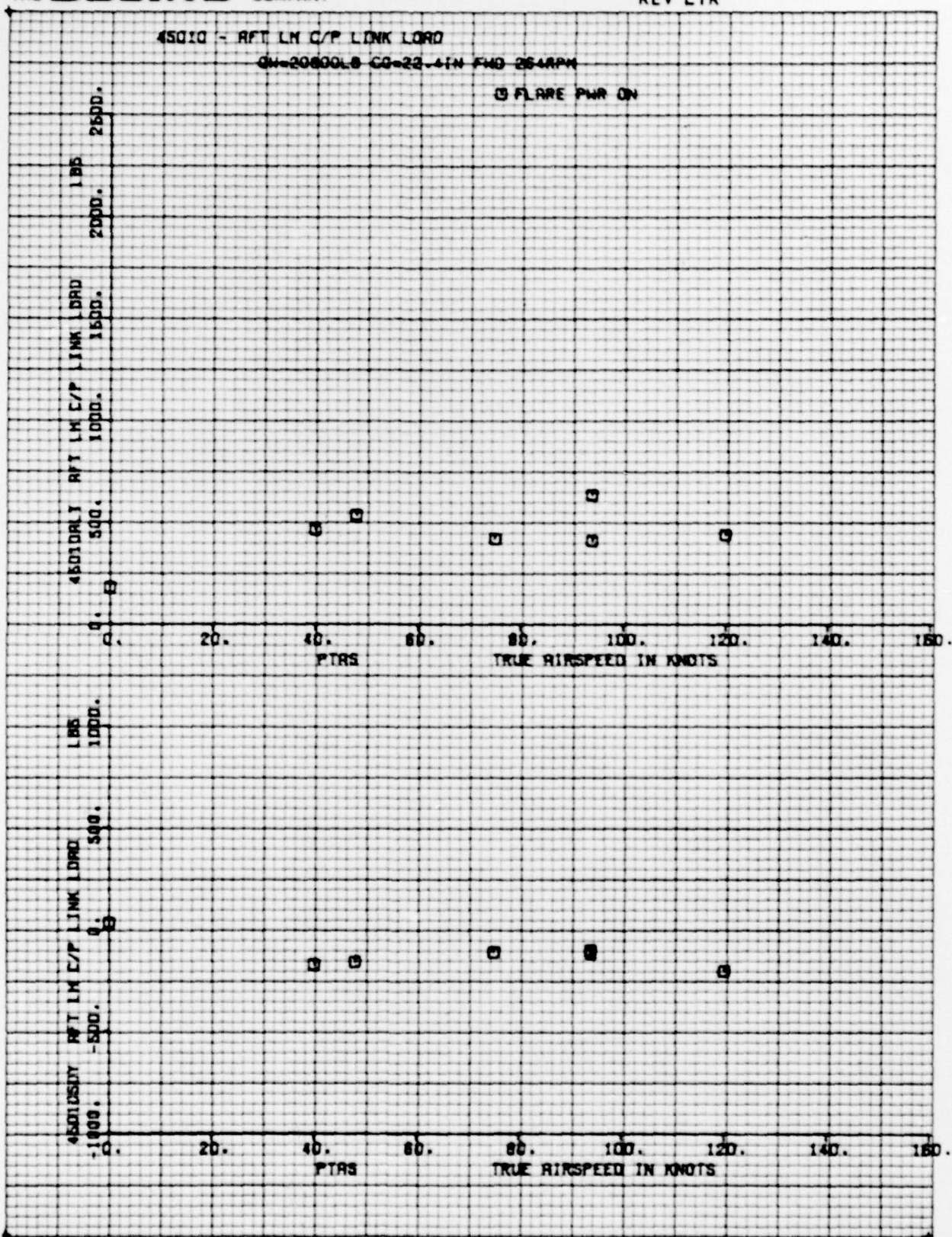
THE **BOEING** COMPANY

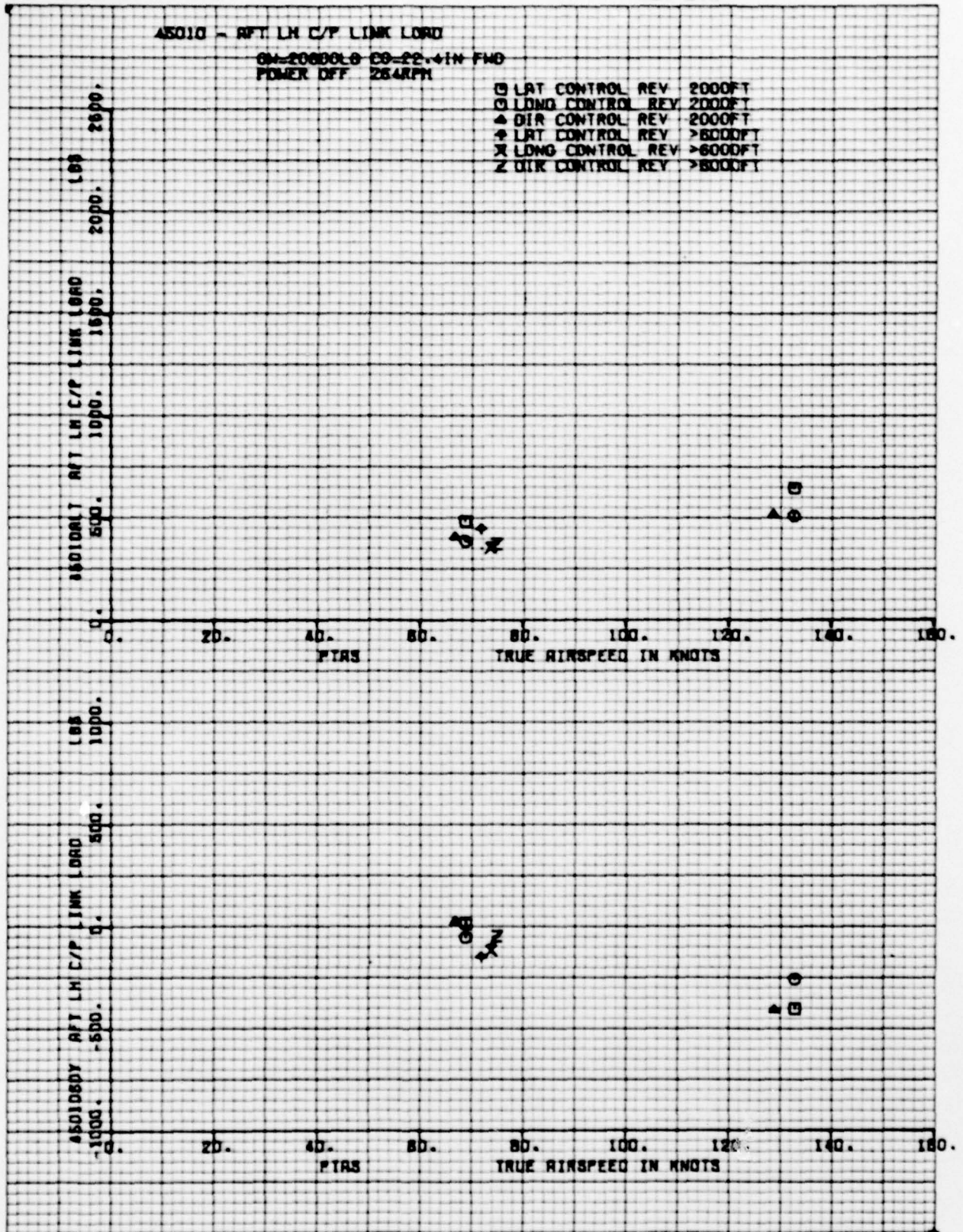
45010 - AFT LH C/P LINK LOAD

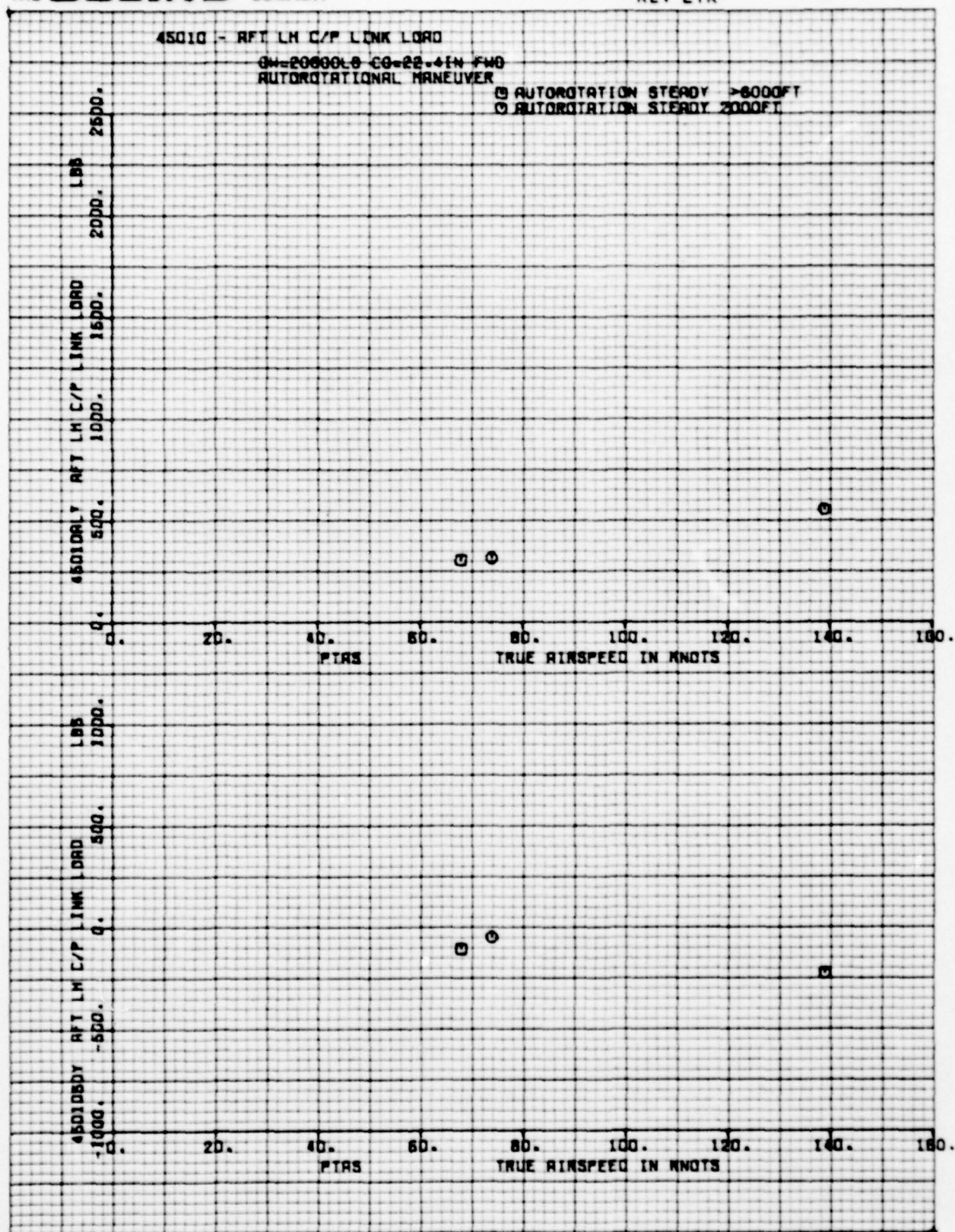
GW=20800LB CG=22.4IN FWD
POWER ON 264RPM

□ LAT CONTROL REV 2000FT
 ○ LONG CONTROL REV 2000FT
 ▲ DIR CONTROL REV 2000FT
 + LAT CONTROL REV 6000FT
 × LONG CONTROL REV 6000FT
 ◇ DIR CONTROL REV 6000FT
 ◆ LAT CONTROL REV >6000FT
 X LONG CONTROL REV >6000FT
 Z DIR CONTROL REV >6000FT



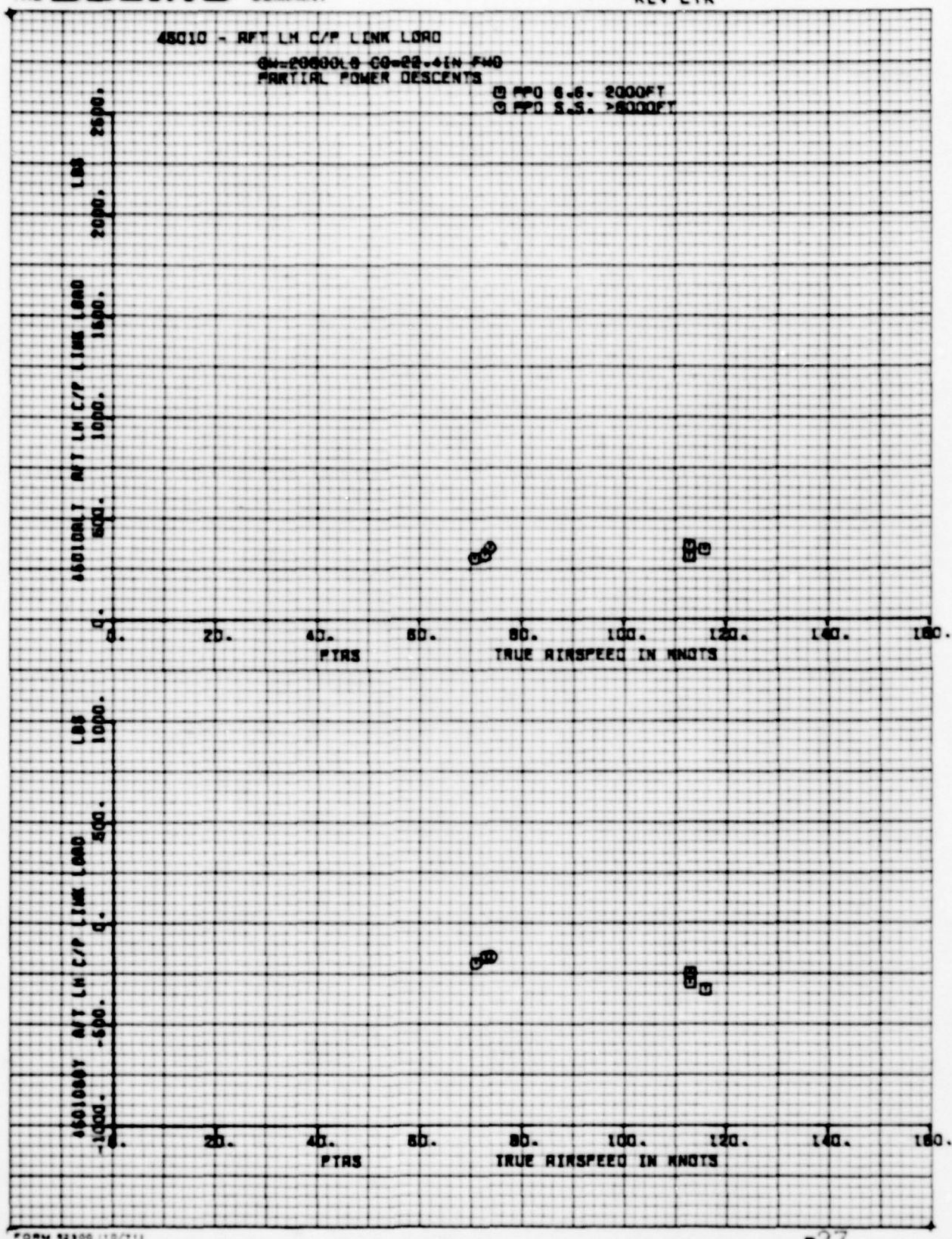




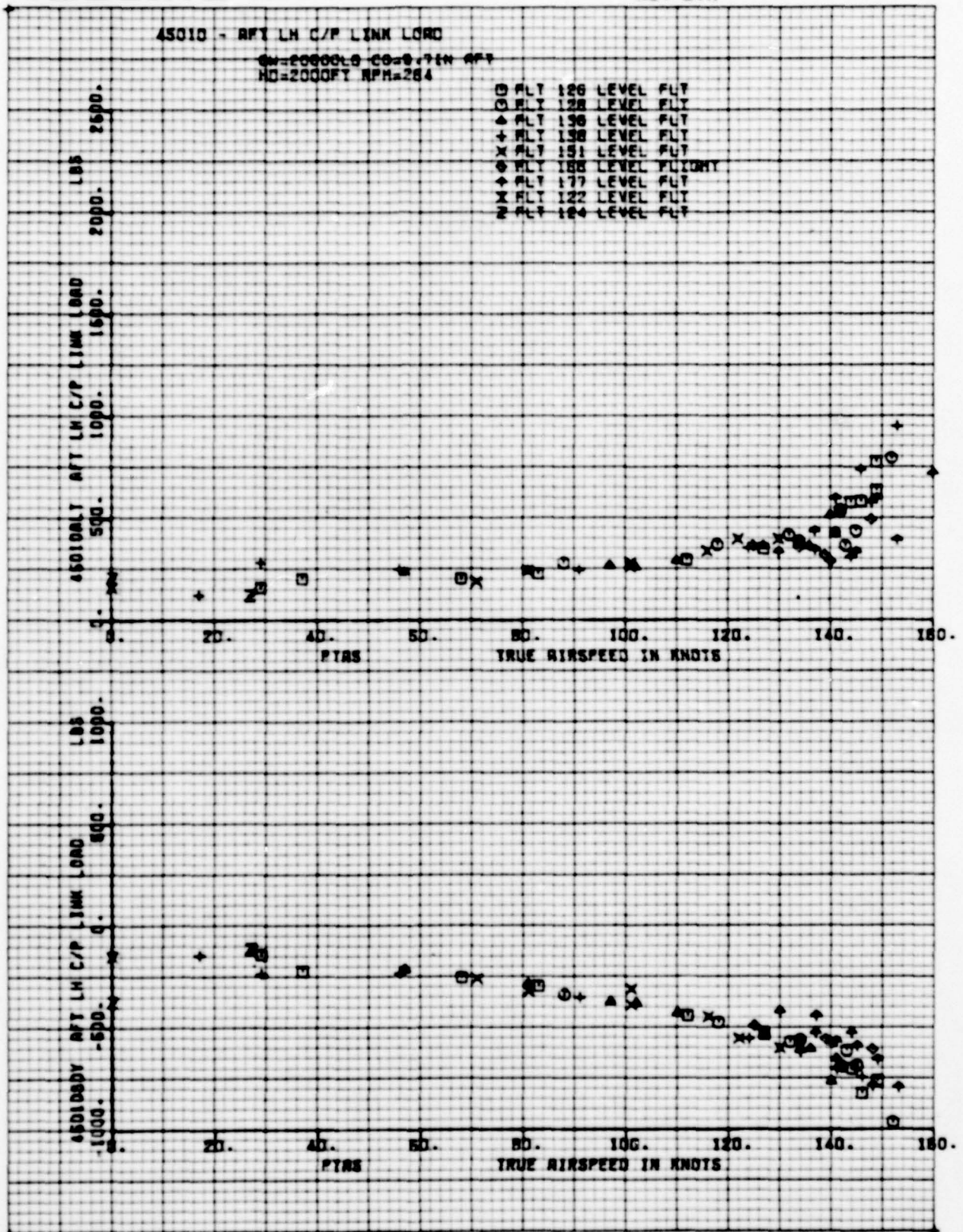
THE **BOEING** COMPANY

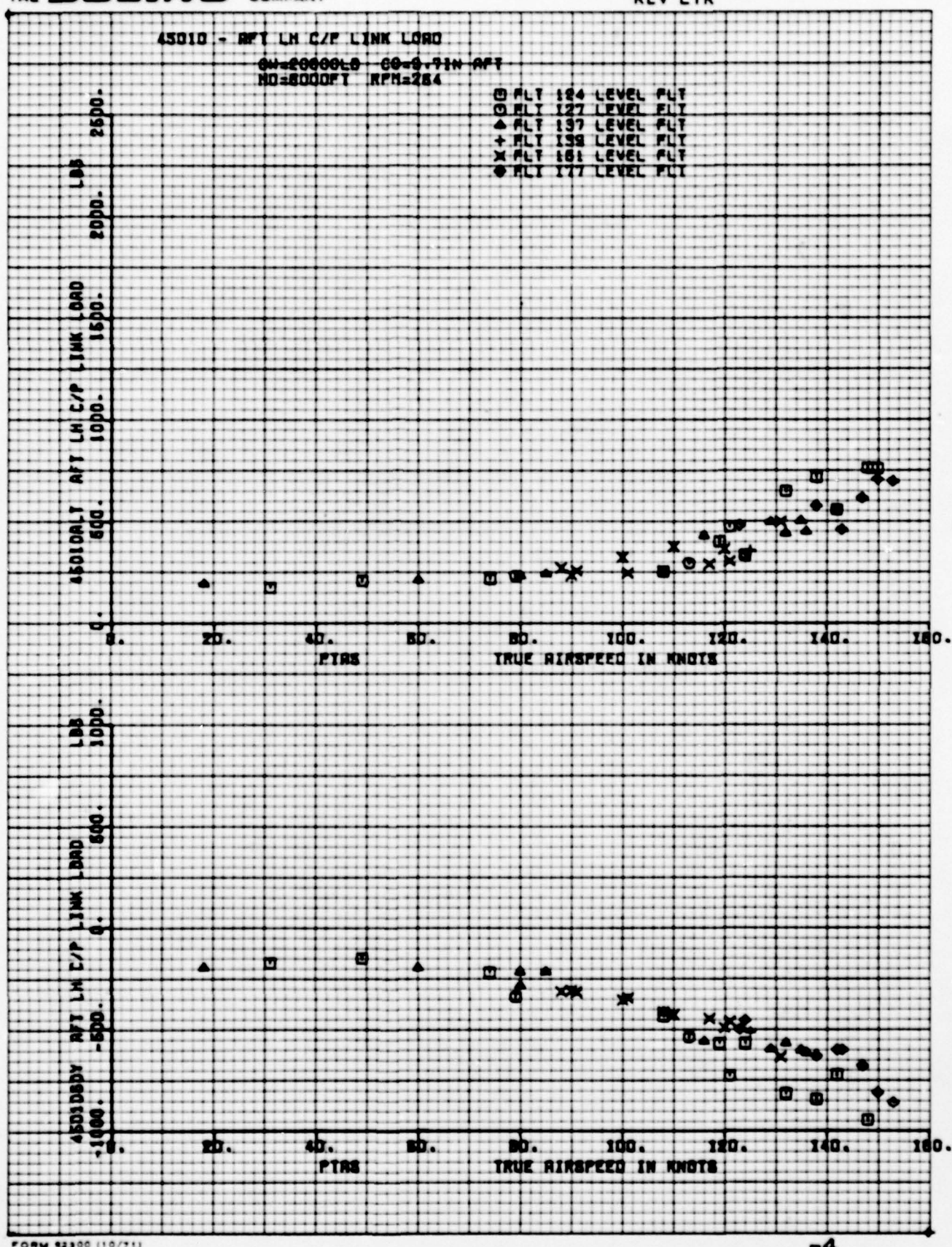
FORM 52300 (10/71)

-27

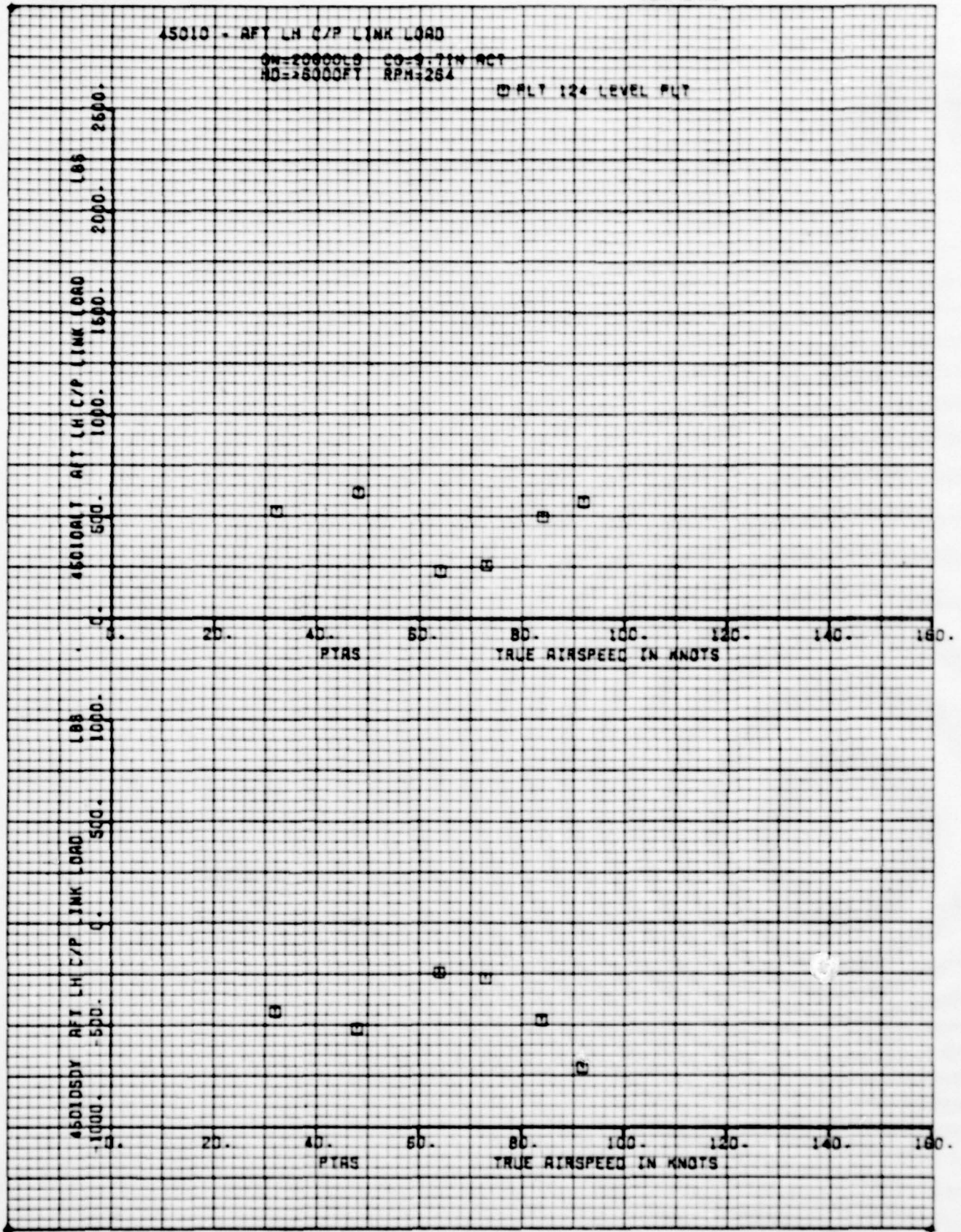
THE **BOEING** COMPANY

FORM 52305 (10/71)



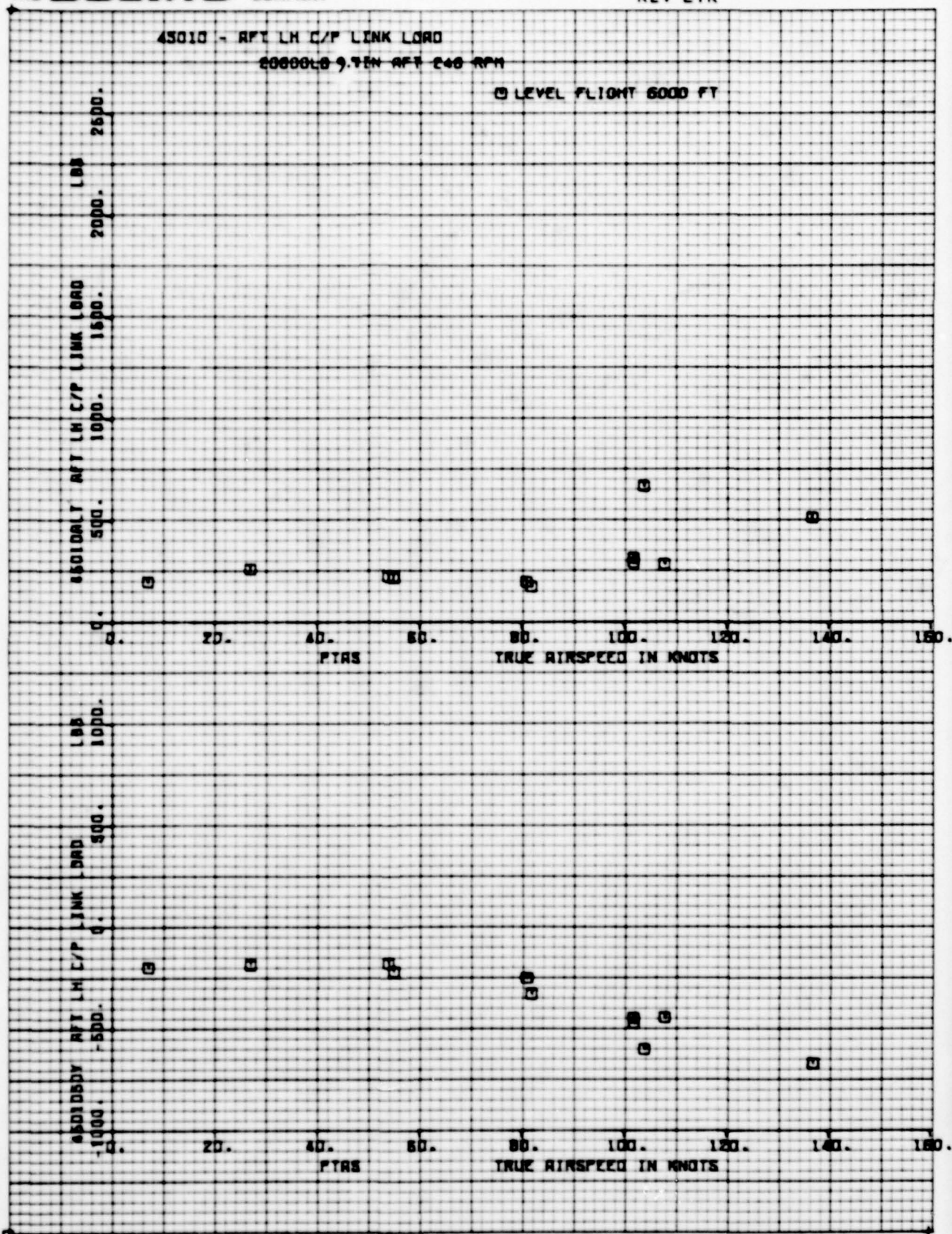
THE **BOEING** COMPANY

FORM 82300 (10/71)



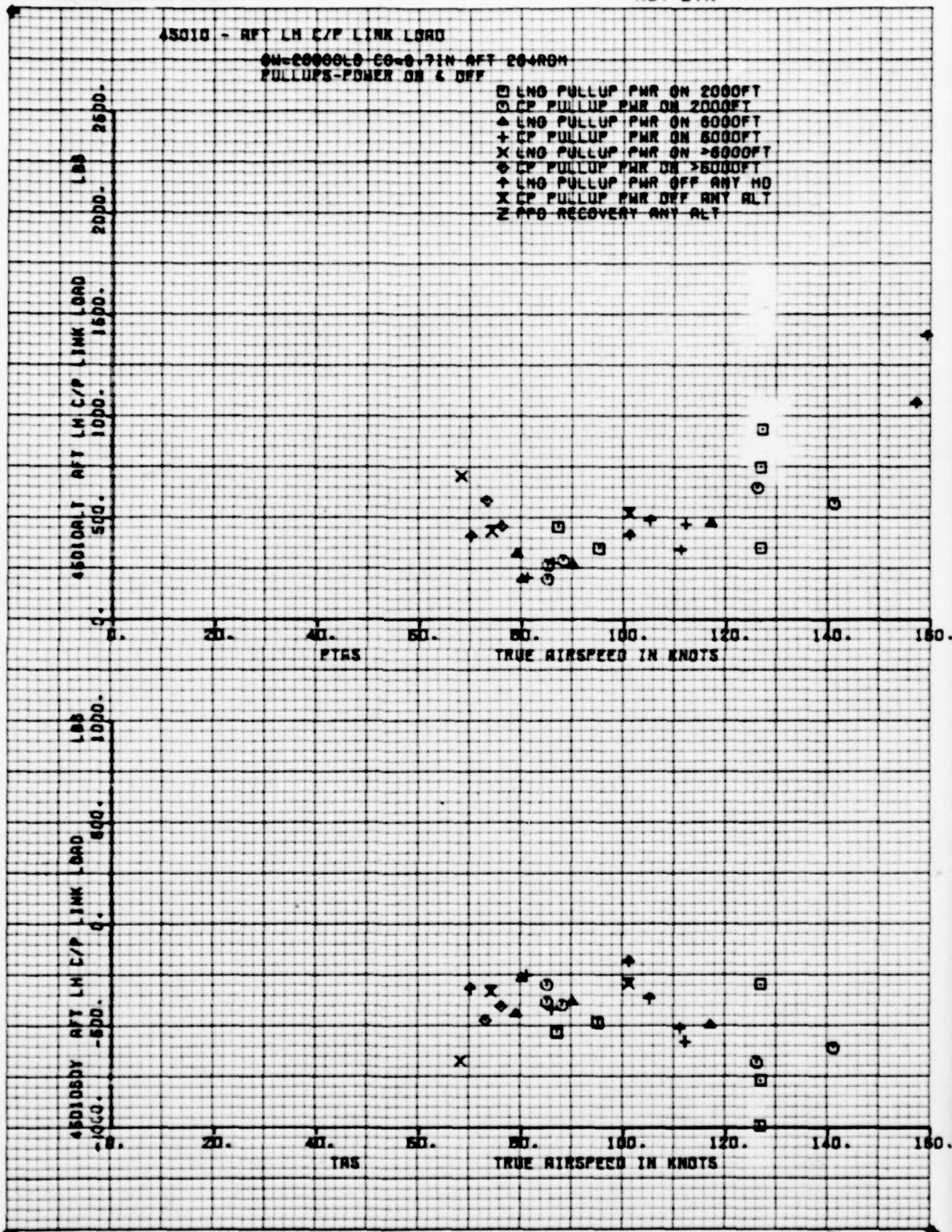
FORM 52300 (10/71)

THE **BOEING** COMPANY



FORM 82300 (10/71)

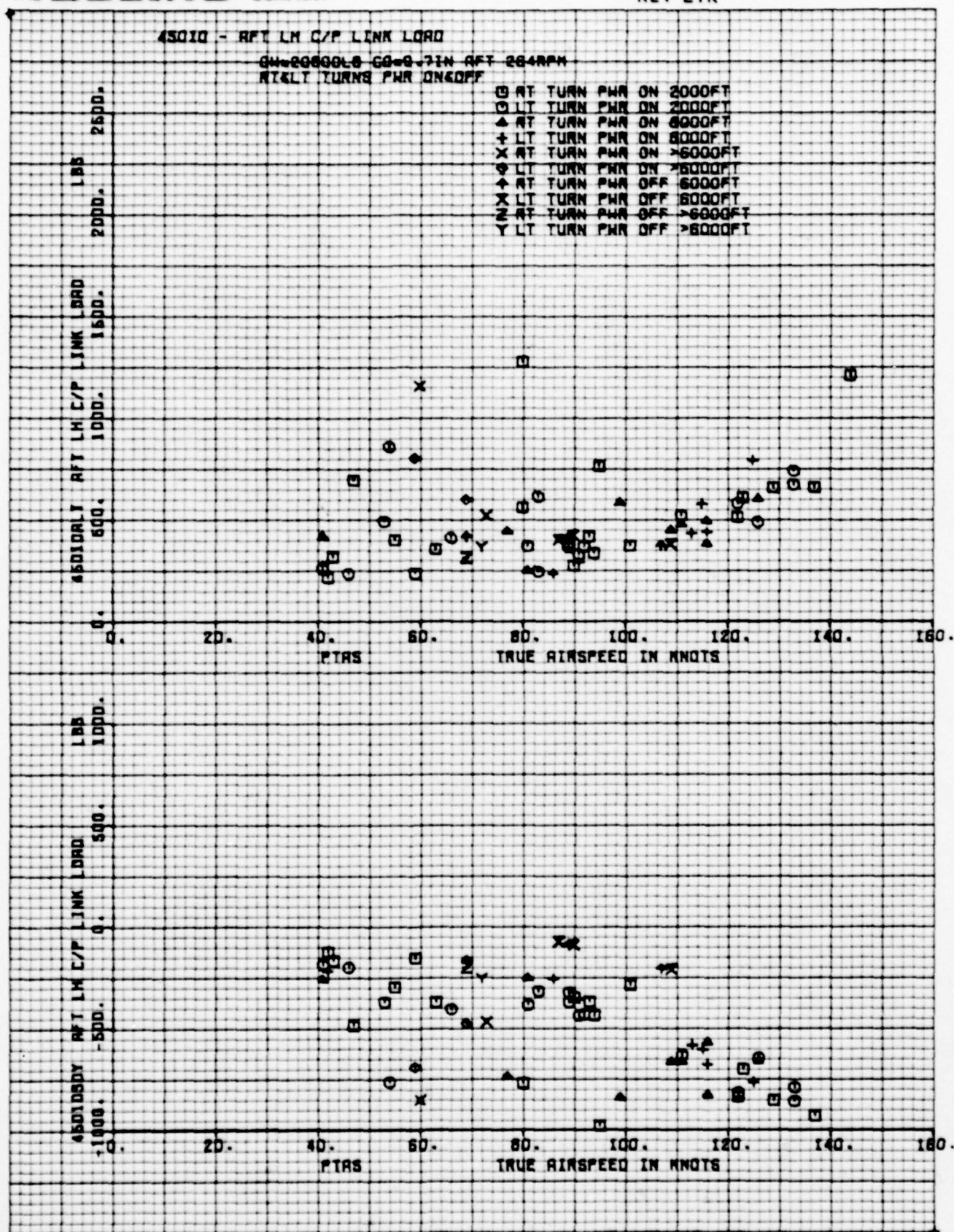
THE **BOEING** COMPANY



FORM 52300 (10/71)

THE **BOEING** COMPANYNUMBER
REV LTR

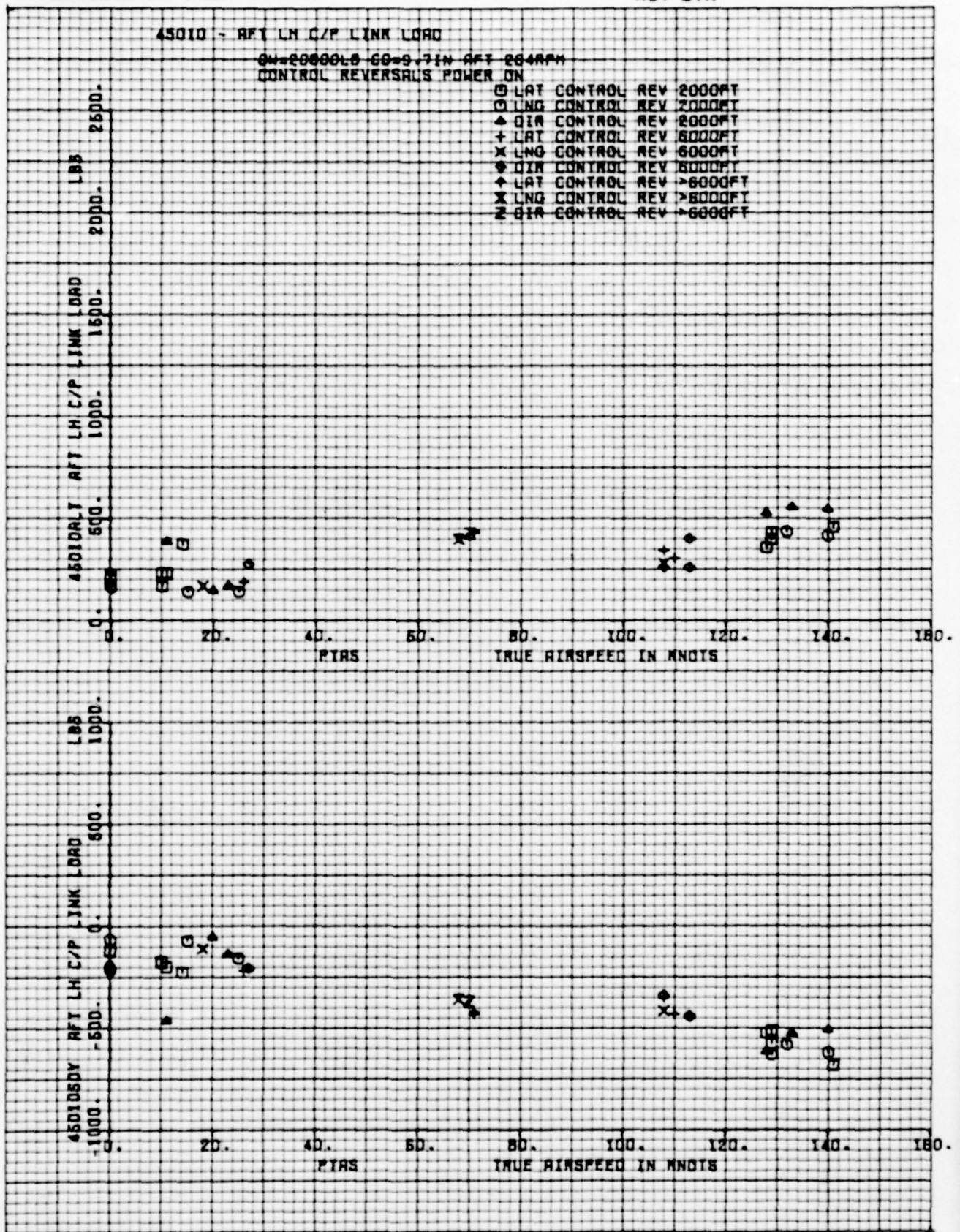
VOLUME 7

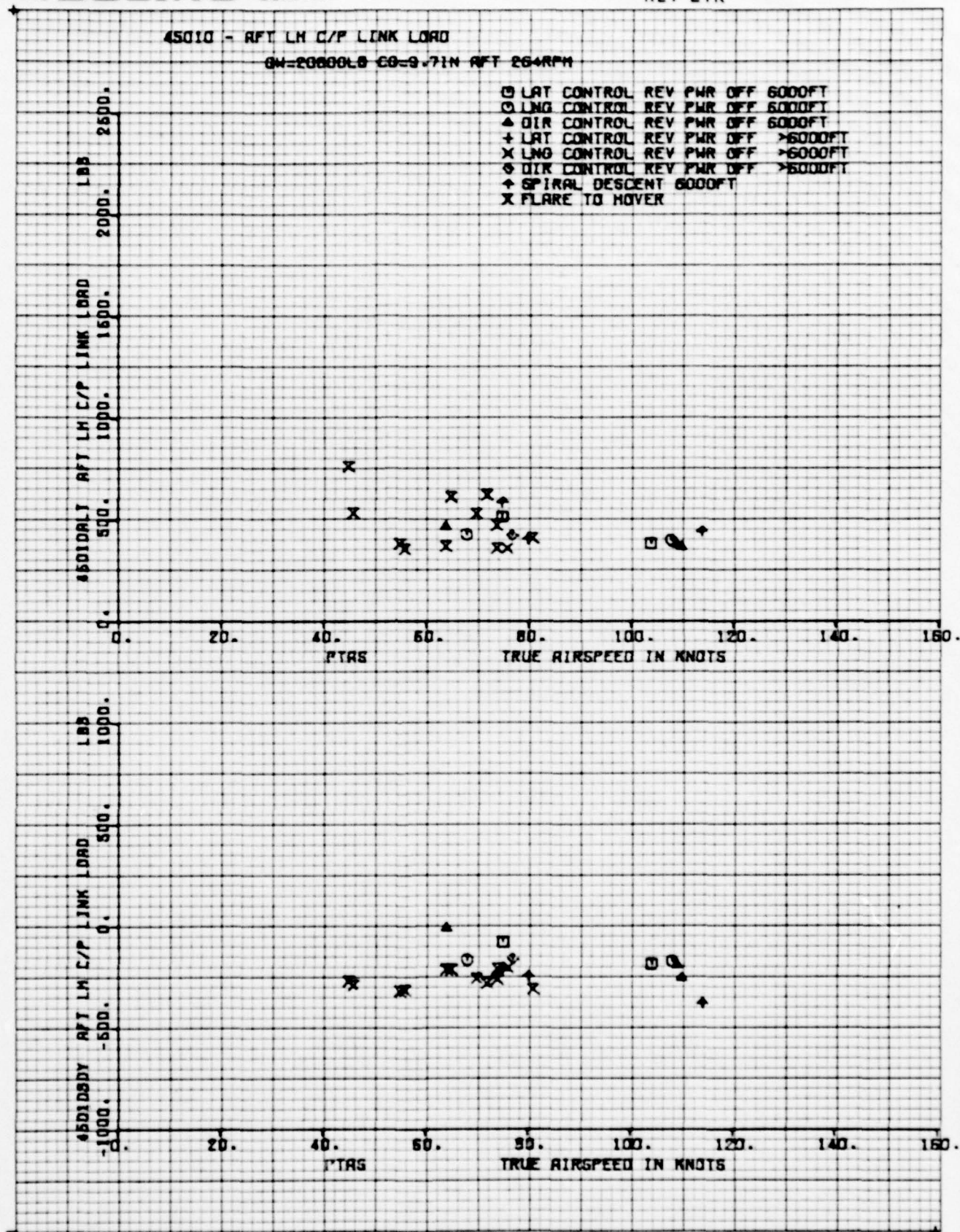


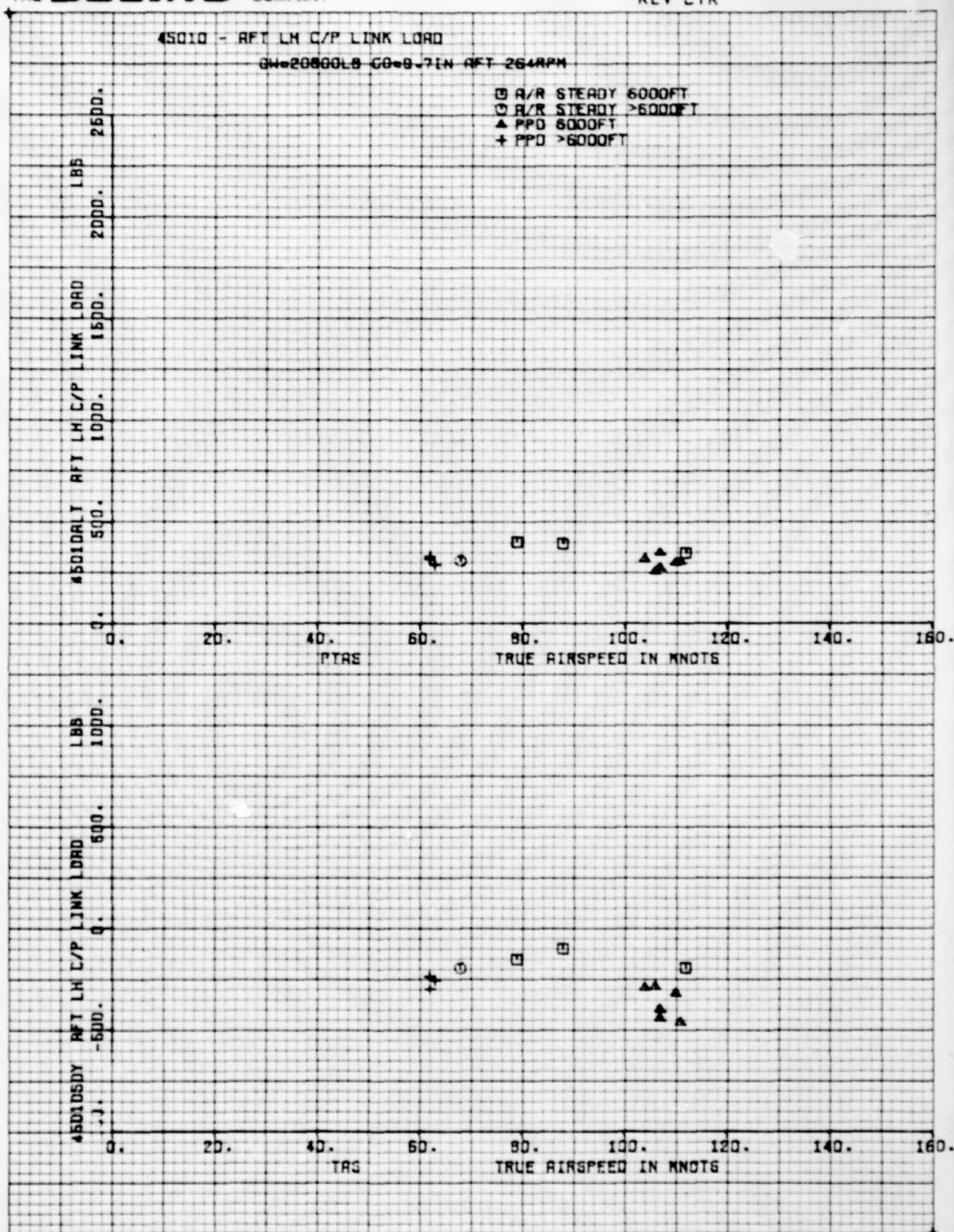
FORM 82300 (10/71)

SHEET 213

-16



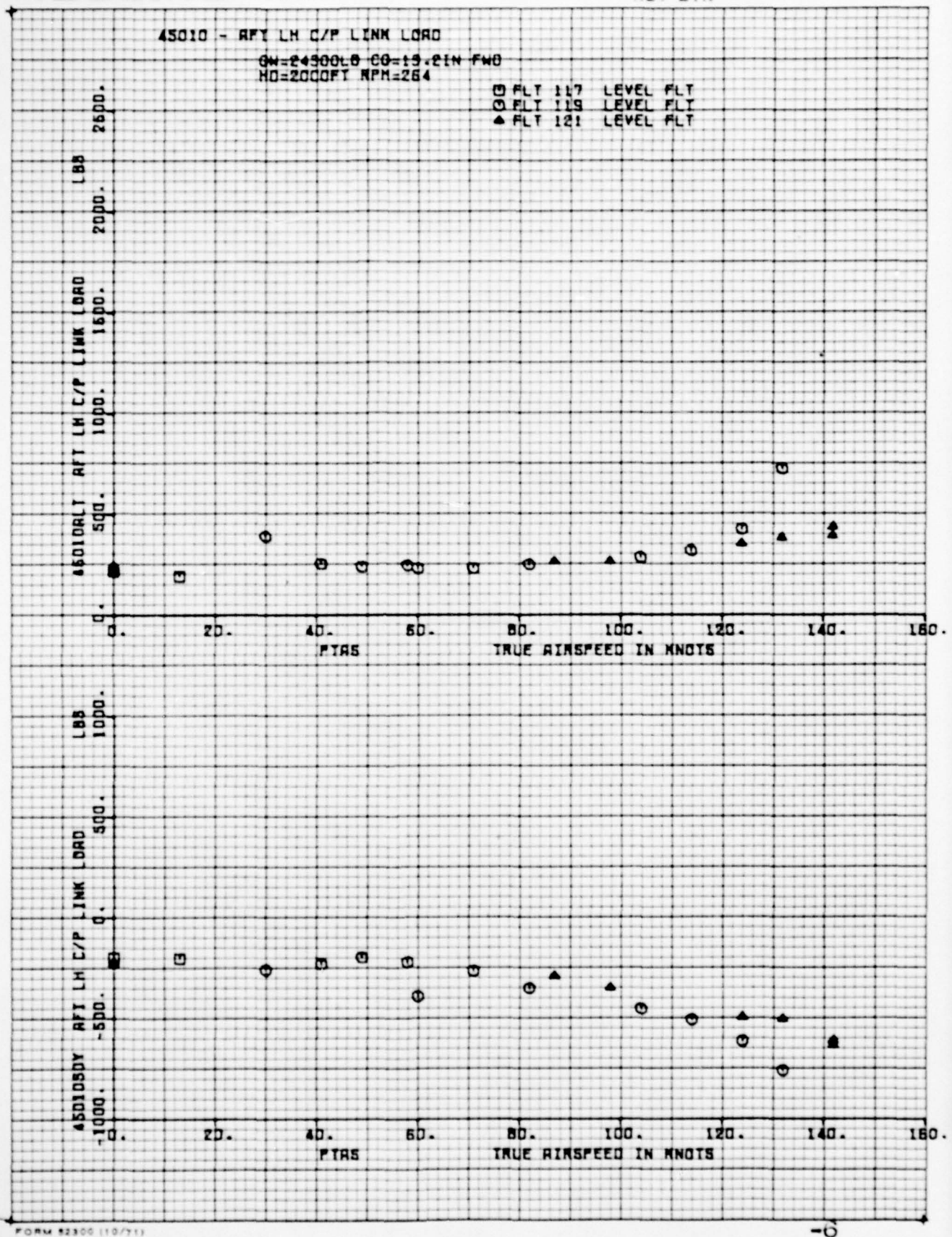


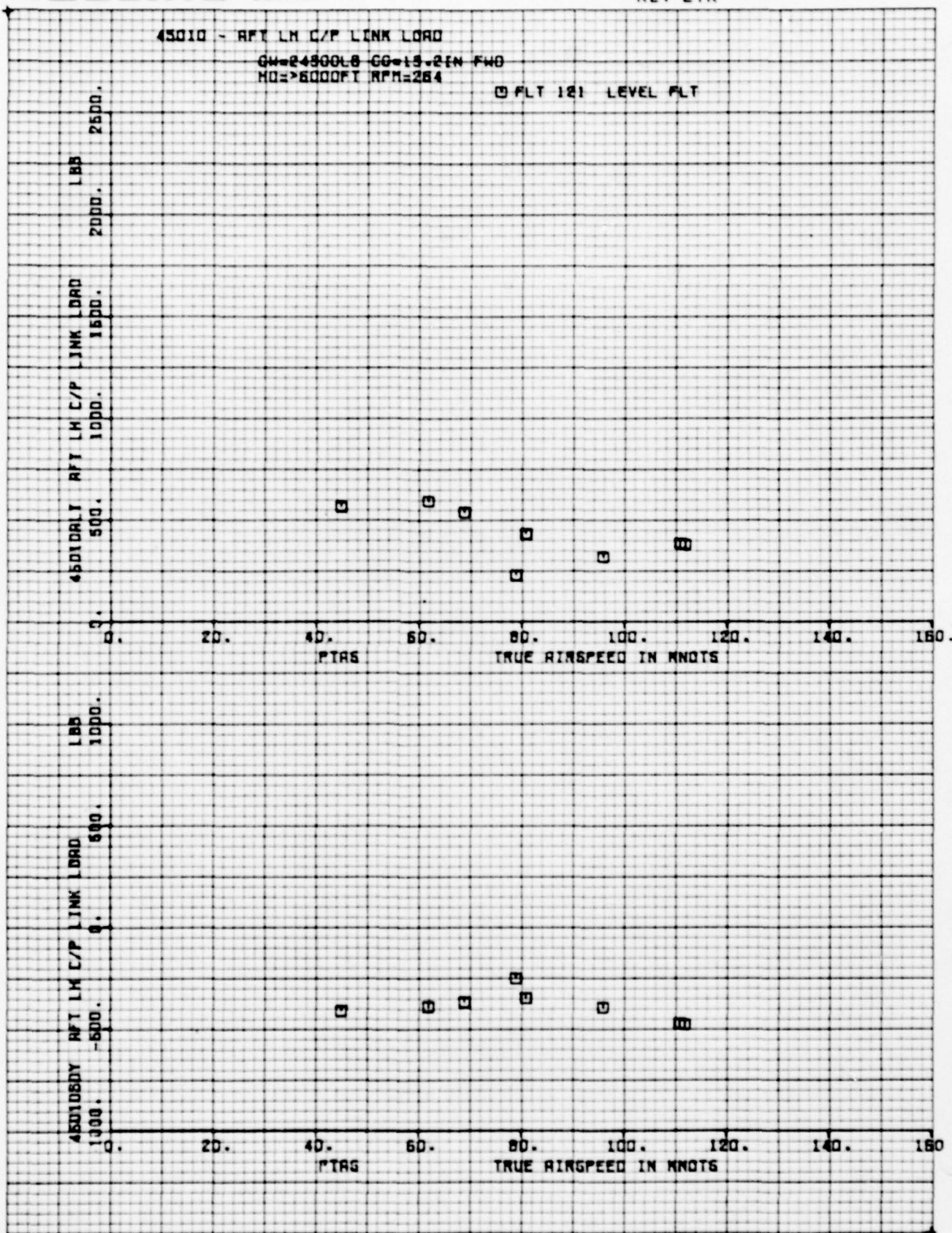
THE **BOEING** COMPANY

FORM 52300 (10/71)

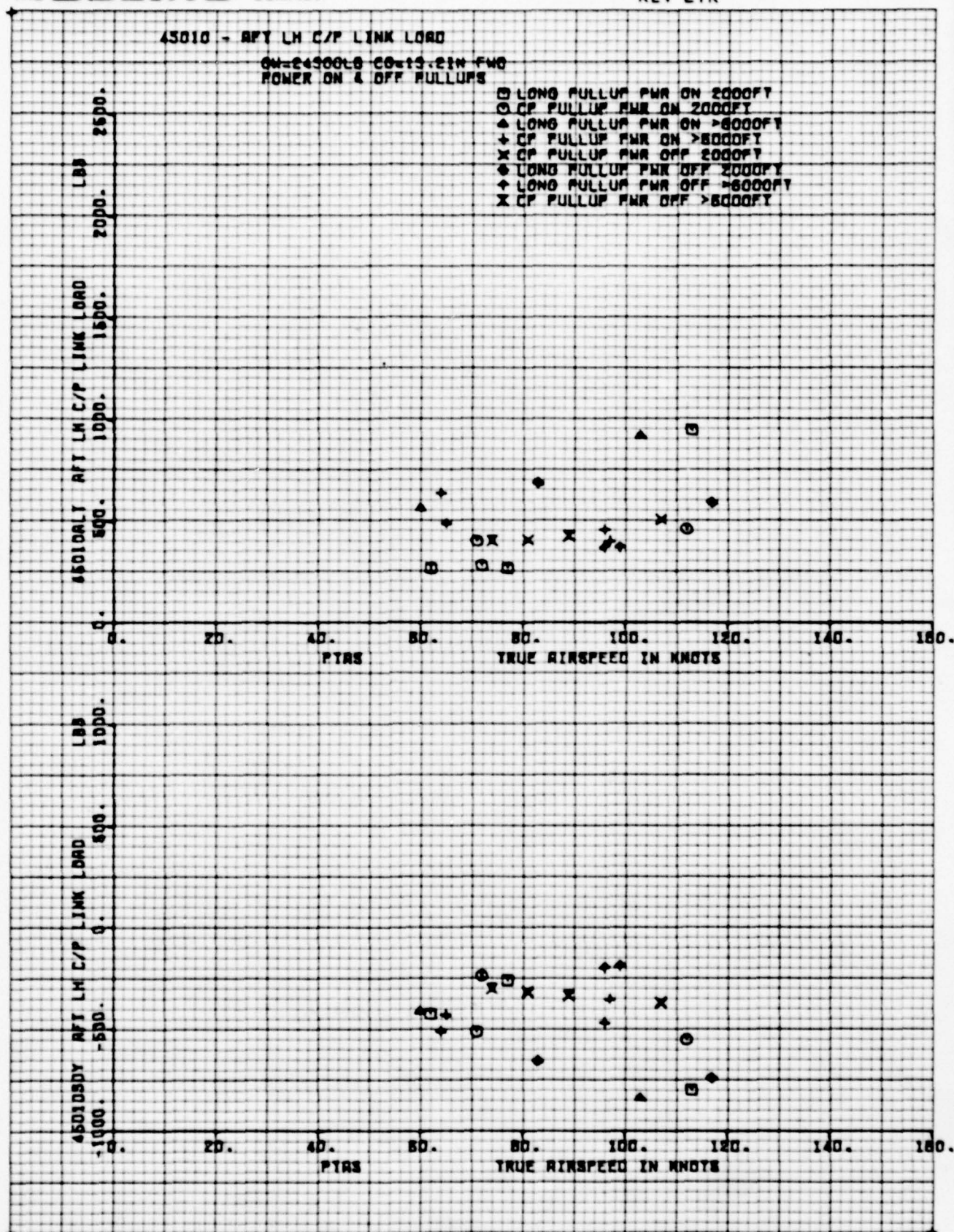
-28

SHEET 216





FORM 52300 (10/71)



THE **BOEING** COMPANY

45010 - AFT LH C/P LINK LOAD

GW=24500LB CG=15.2IN FWD
TURNS POWER ON 40FF 264RPM

O LT TURN PWR ON 2000FT
 O RT TURN PWR ON 2000FT
 A RT TURN PWR ON >6000FT
 + LT TURN PWR ON >6000FT
 X LT TURN PWR OFF 2000FT
 O RT TURN PWR OFF 2000FT
 + LT TURN PWR OFF >6000FT
 X RT TURN PWR OFF >6000FT

 LBS
 2500.
 2000.
 1500.
 1000.
 500.
 0.

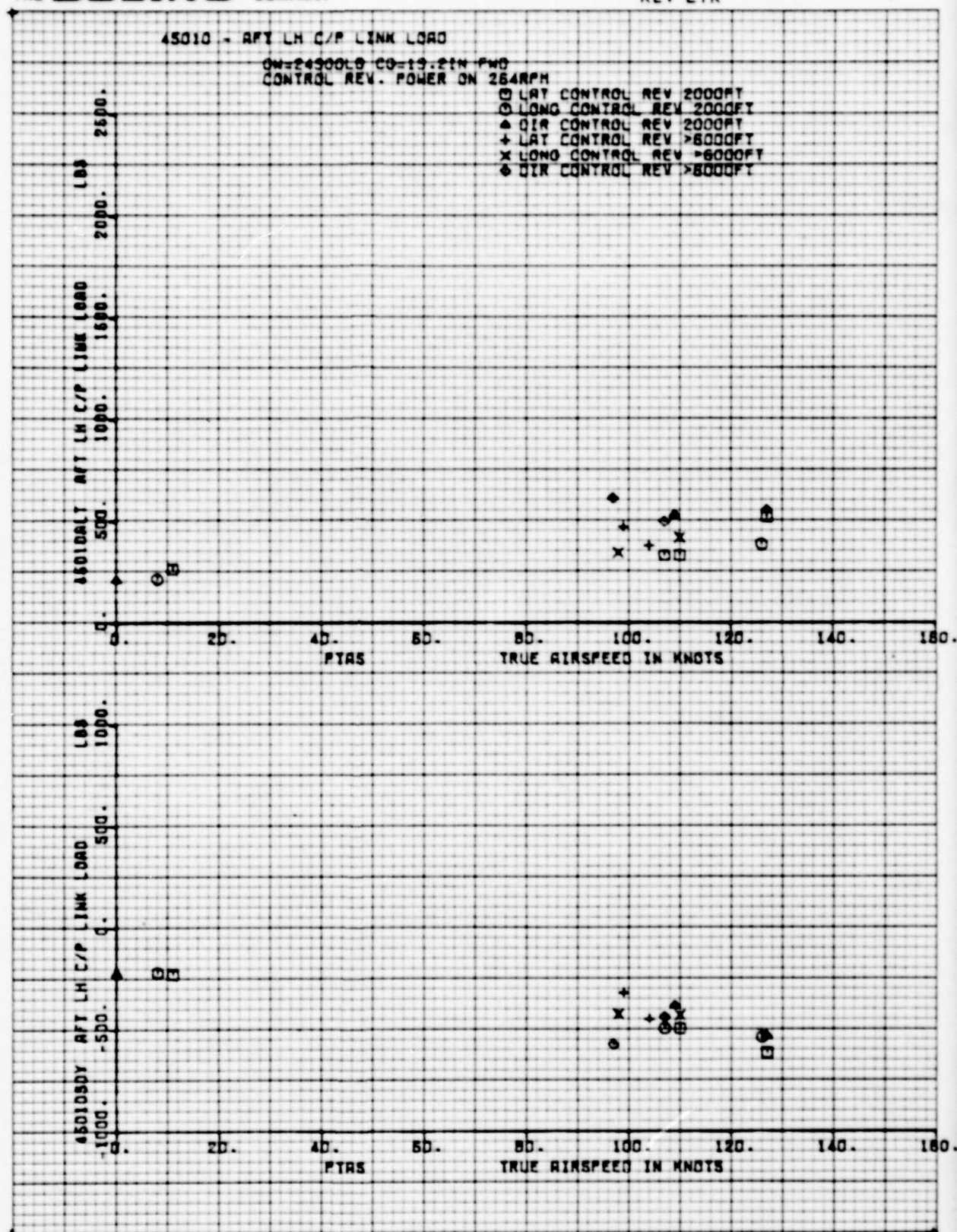
45010ALT AFT LH C/P LINK LOAD

 20. 40. 60. 80. 100. 120. 140. 160.
 PTAS TRUE AIRSPEED IN KNOTS

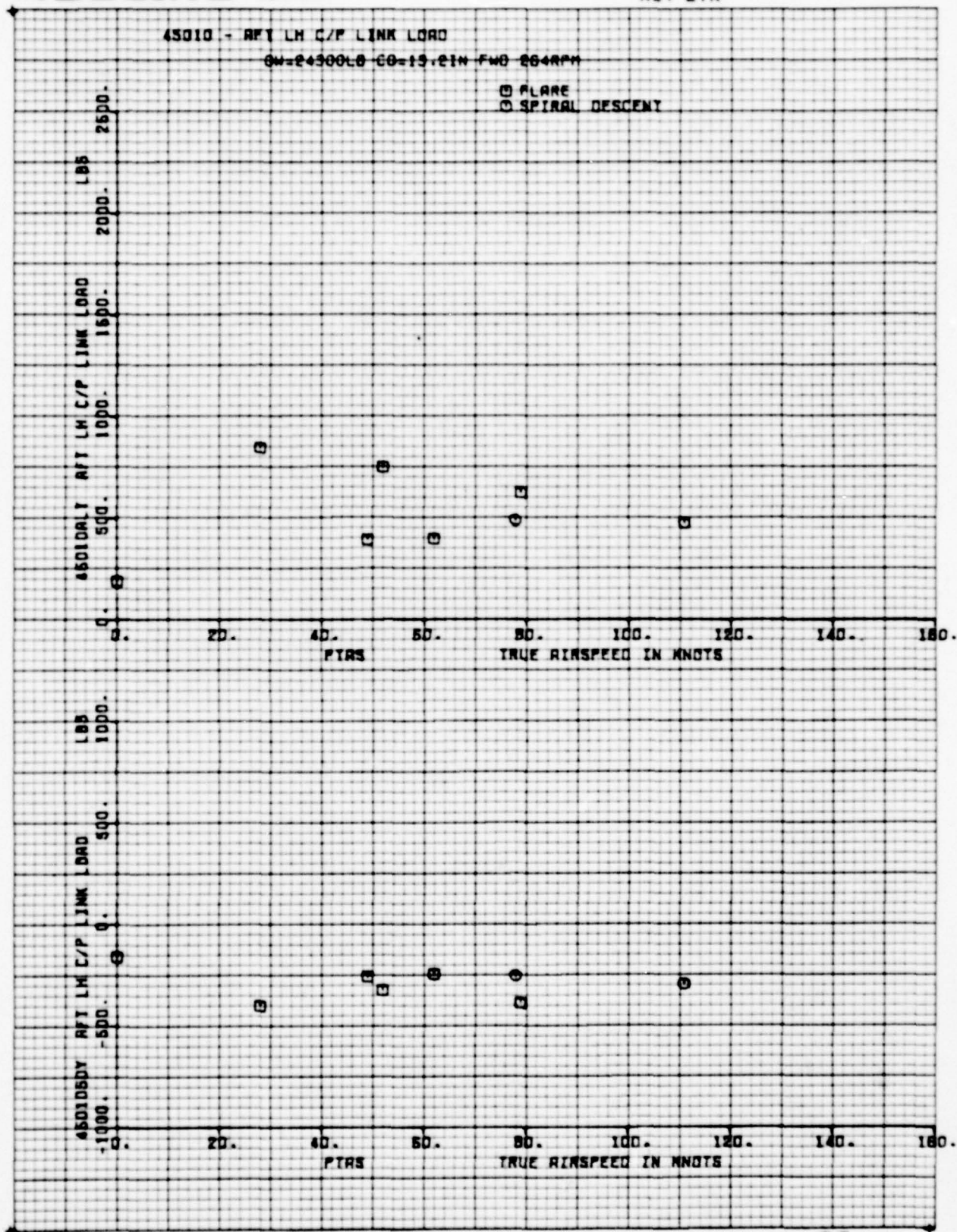
 LBS
 1000.
 500.
 0.
 -500.
 -1000.

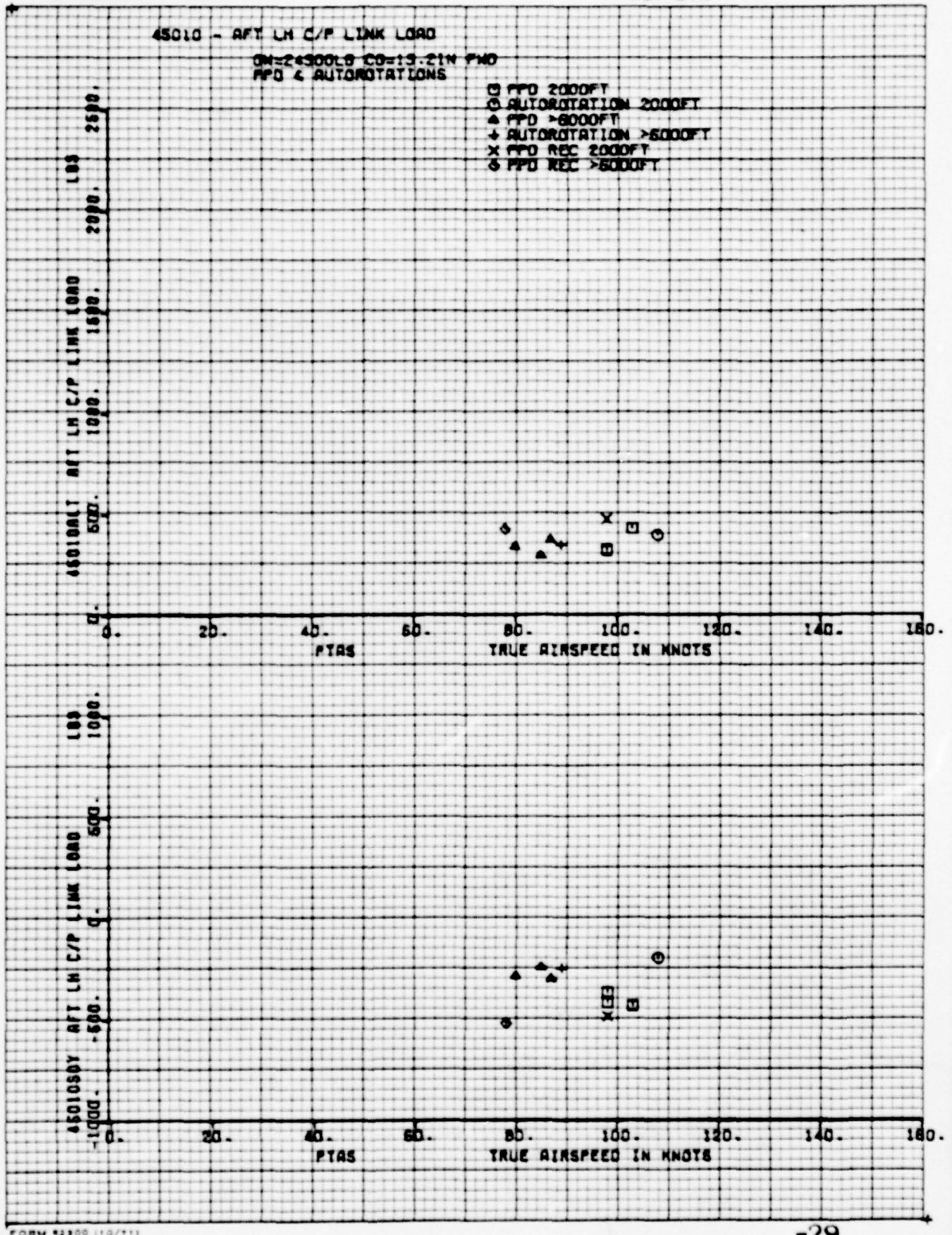
45010SDY AFT LH C/P LINK LOAD

 20. 40. 60. 80. 100. 120. 140. 160.
 PTAS TRUE AIRSPEED IN KNOTS



FORM 52300 (10/71)

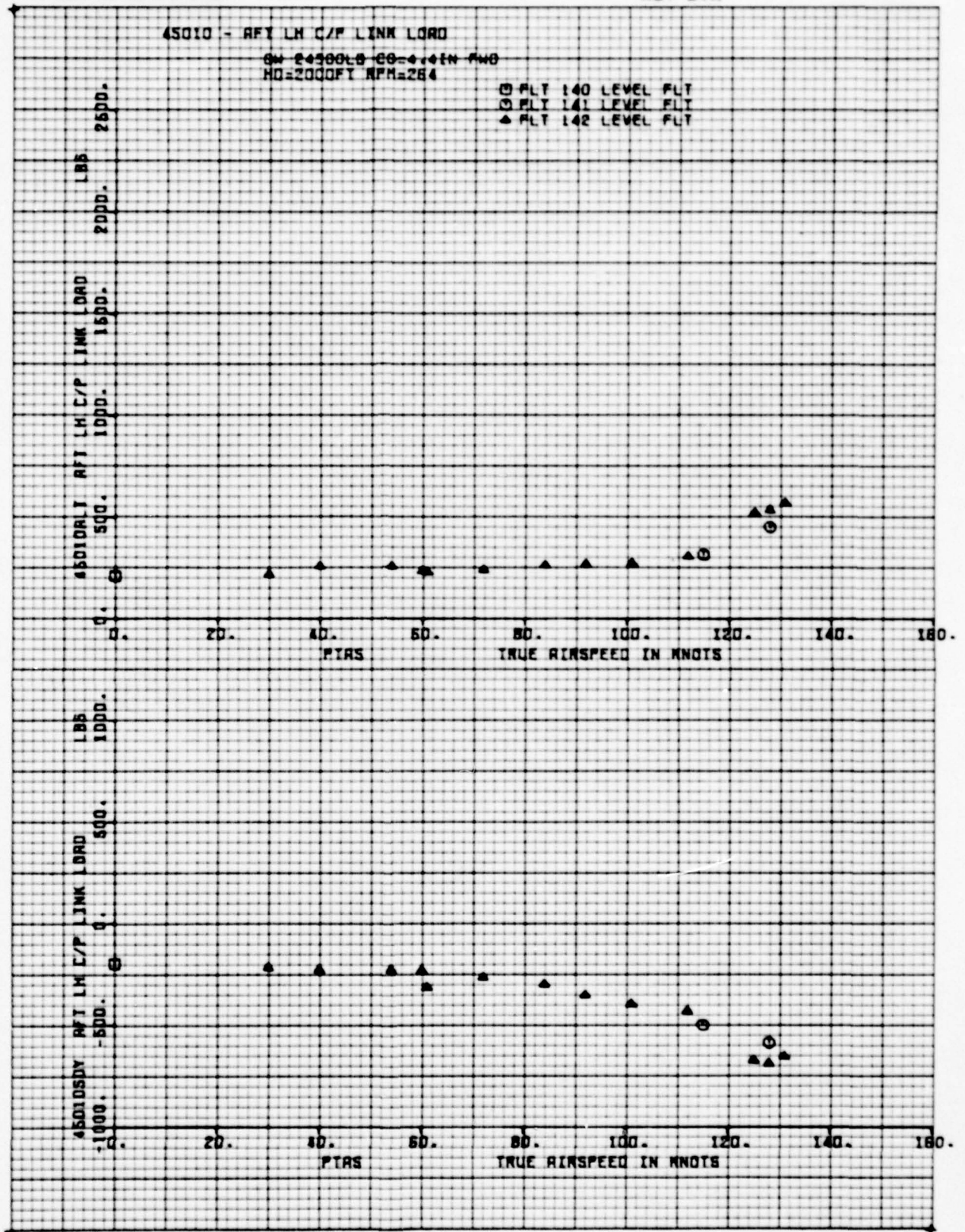


THE **BOEING** COMPANY

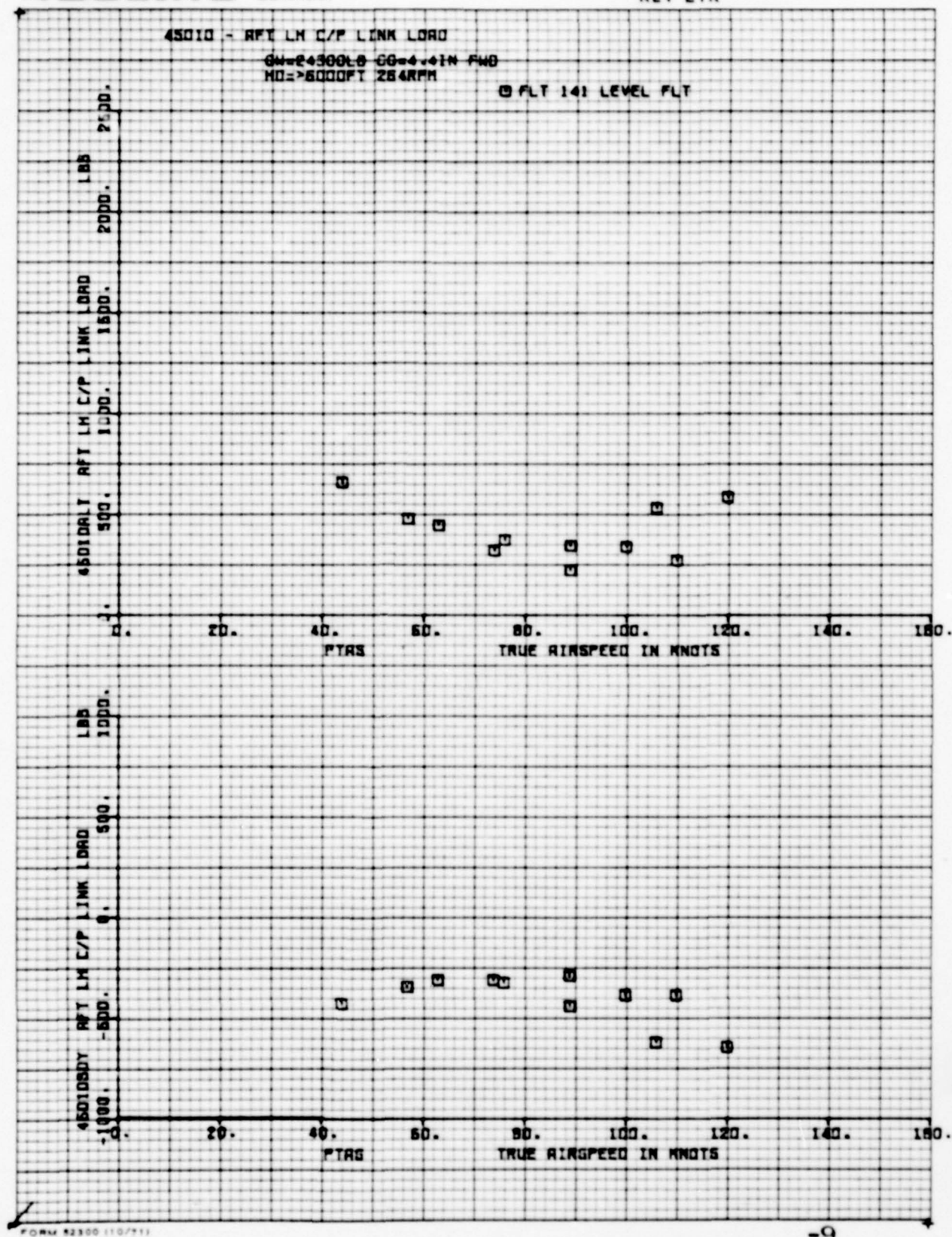
FORM 82300 (10/71)

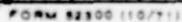
SHEET 223

-29



FORM 82300 (10/71)



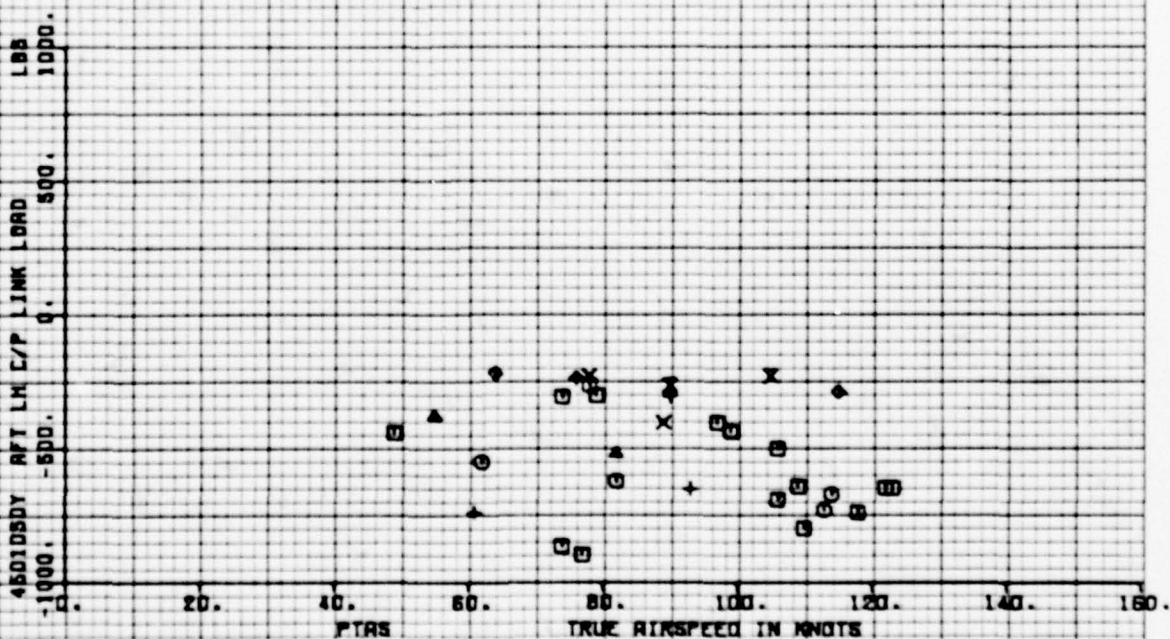
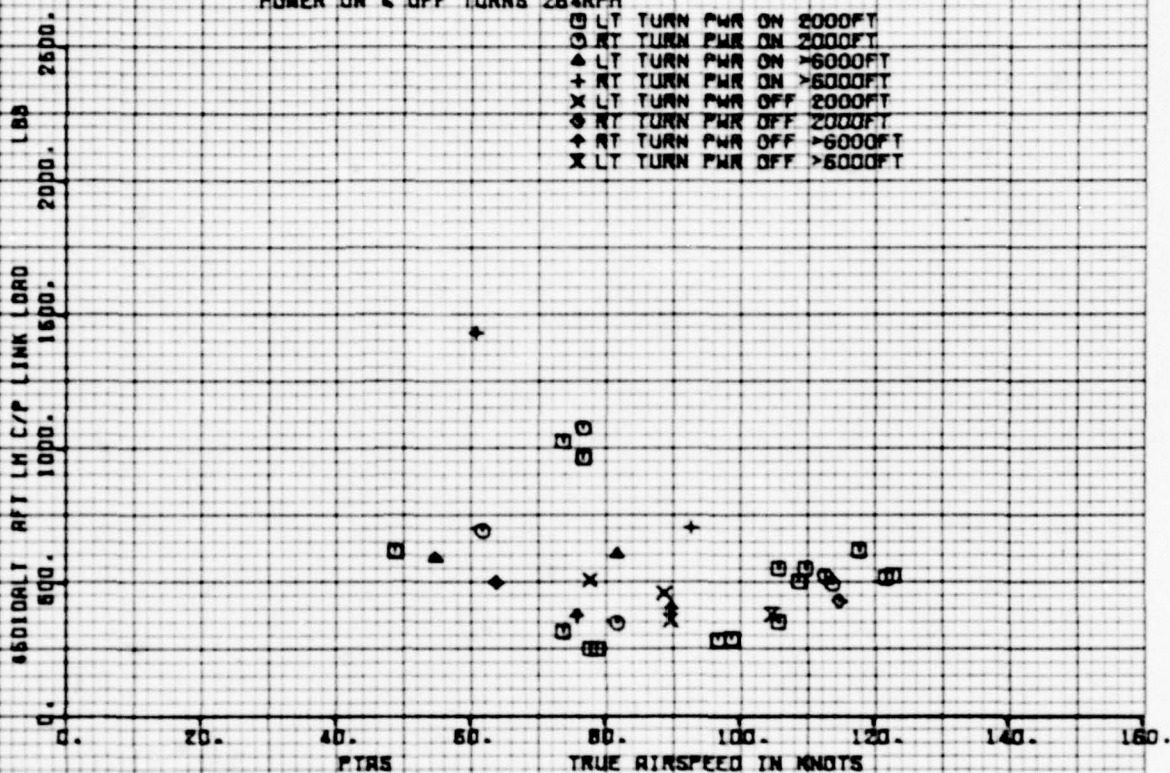


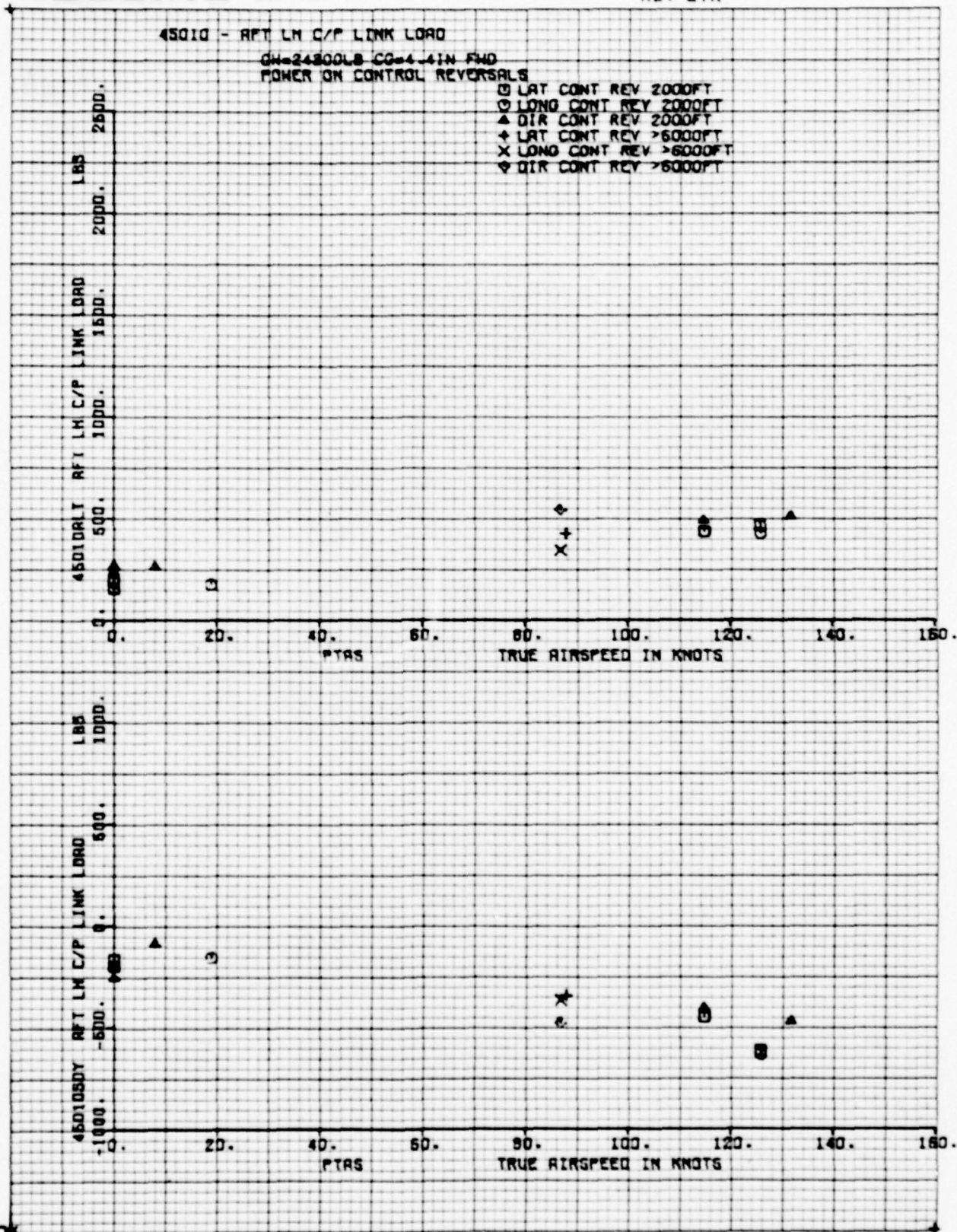
THE **BOEING** COMPANY

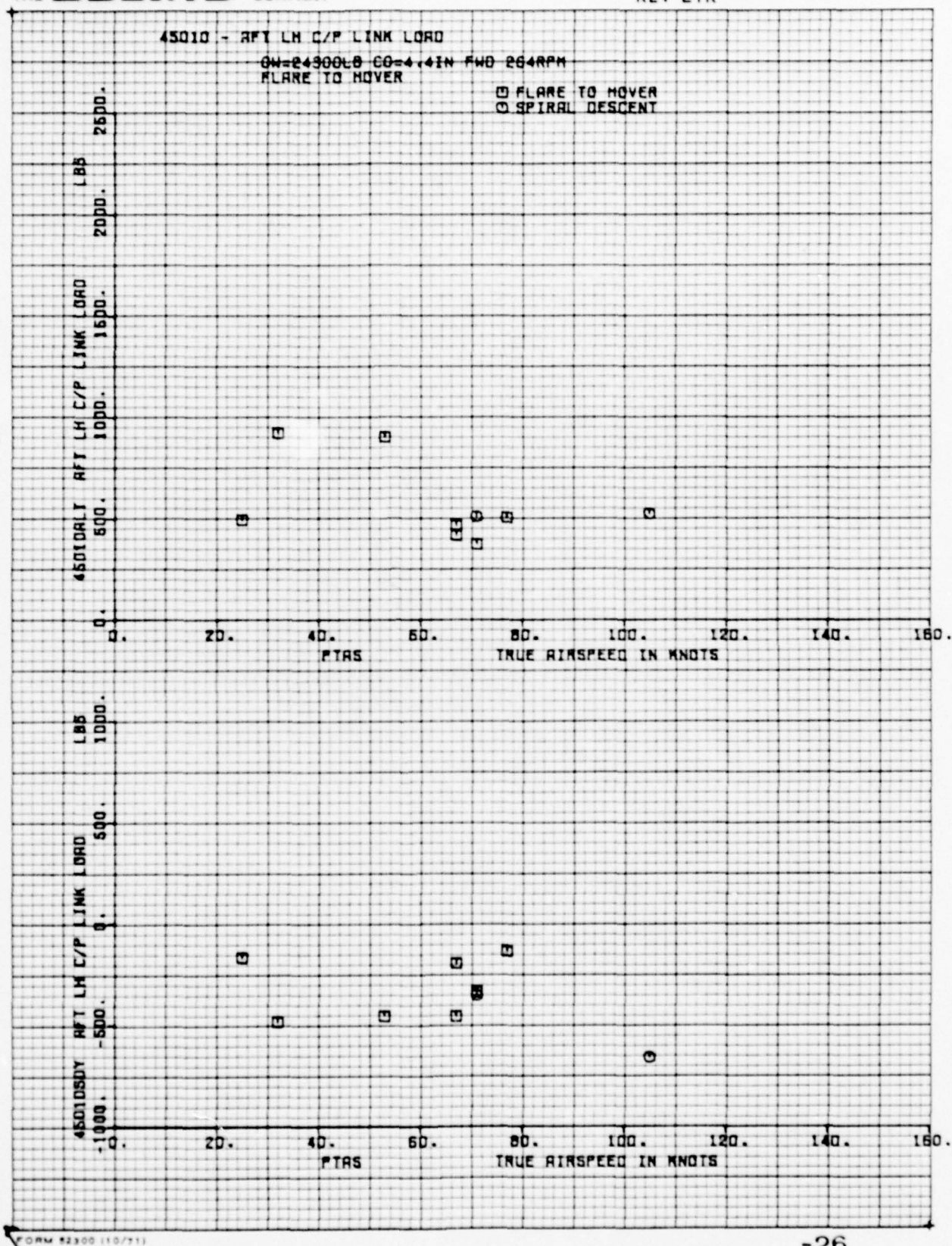
45010 - RPT LH C/P LINK LOAD

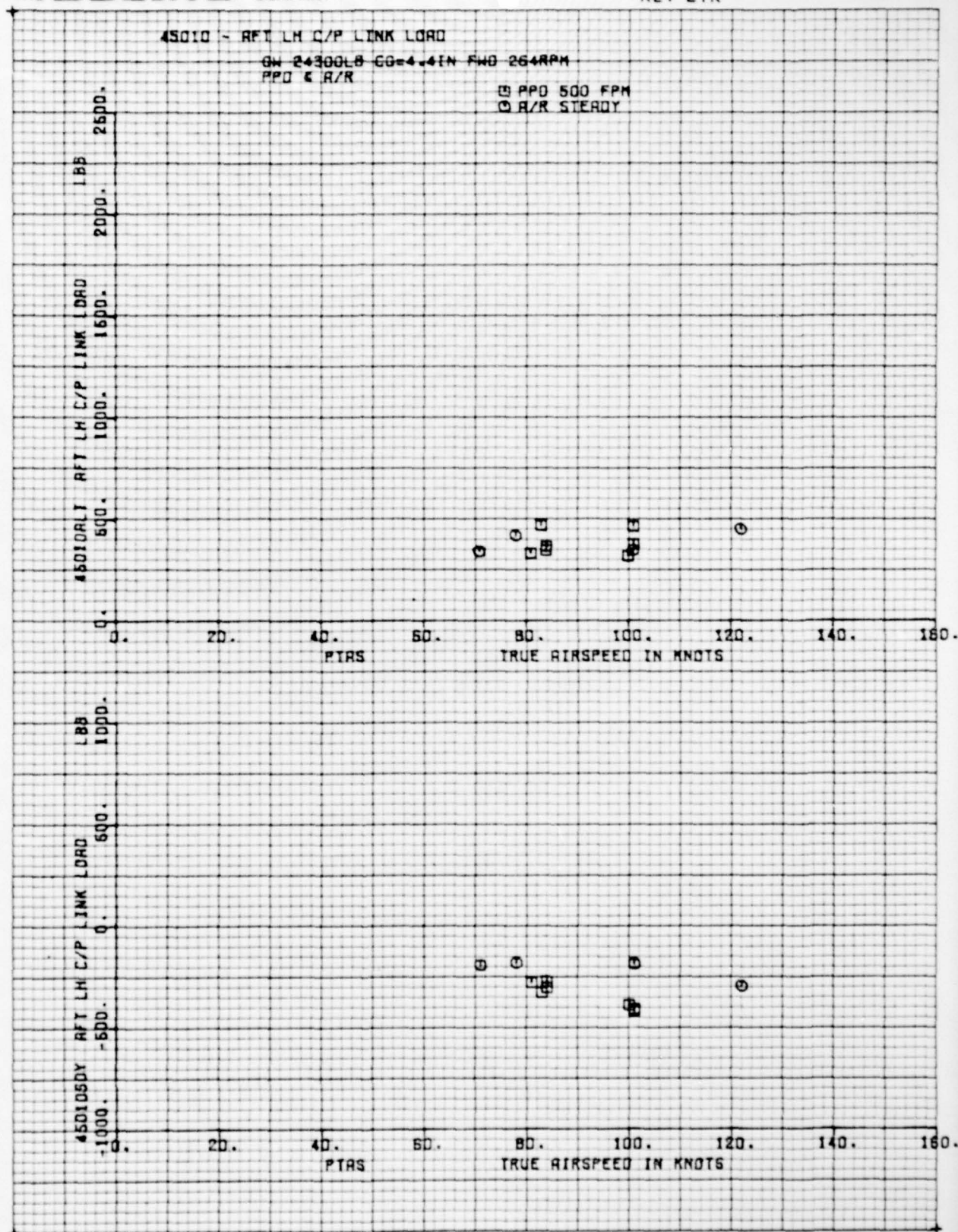
GW=24500LB CO=4.4 FWS
POWER ON & OFF TURNS 264RPM

- LT TURN PWR ON 2000FT
- RT TURN PWR ON 2000FT
- △ LT TURN PWR ON >6000FT
- + RT TURN PWR ON >6000FT
- x LT TURN PWR OFF 2000FT
- ◇ RT TURN PWR OFF 2000FT
- ◆ RT TURN PWR OFF >6000FT
- x LT TURN PWR OFF >6000FT

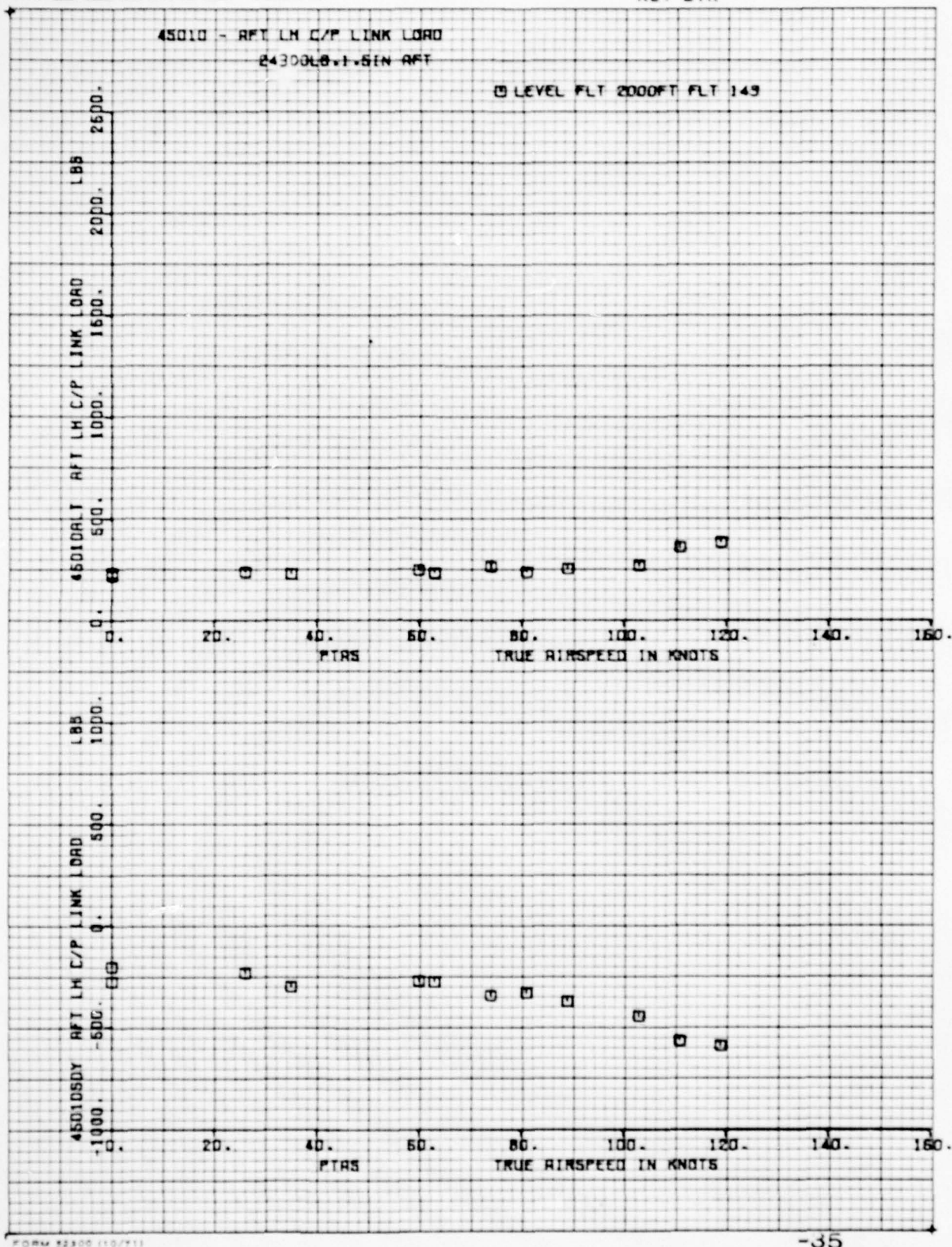






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FORM 52300 (10/71)

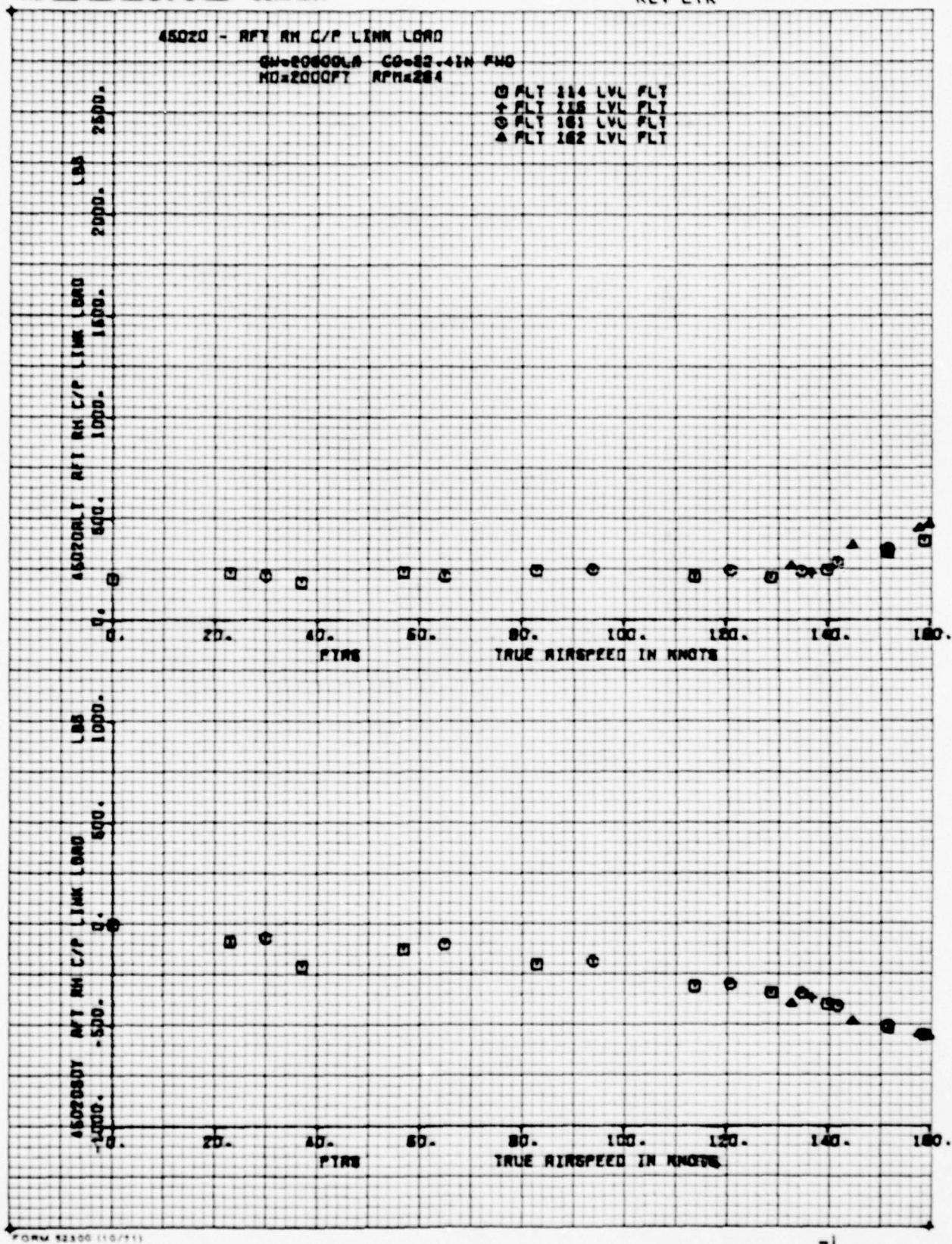


THE **BOEING** COMPANY

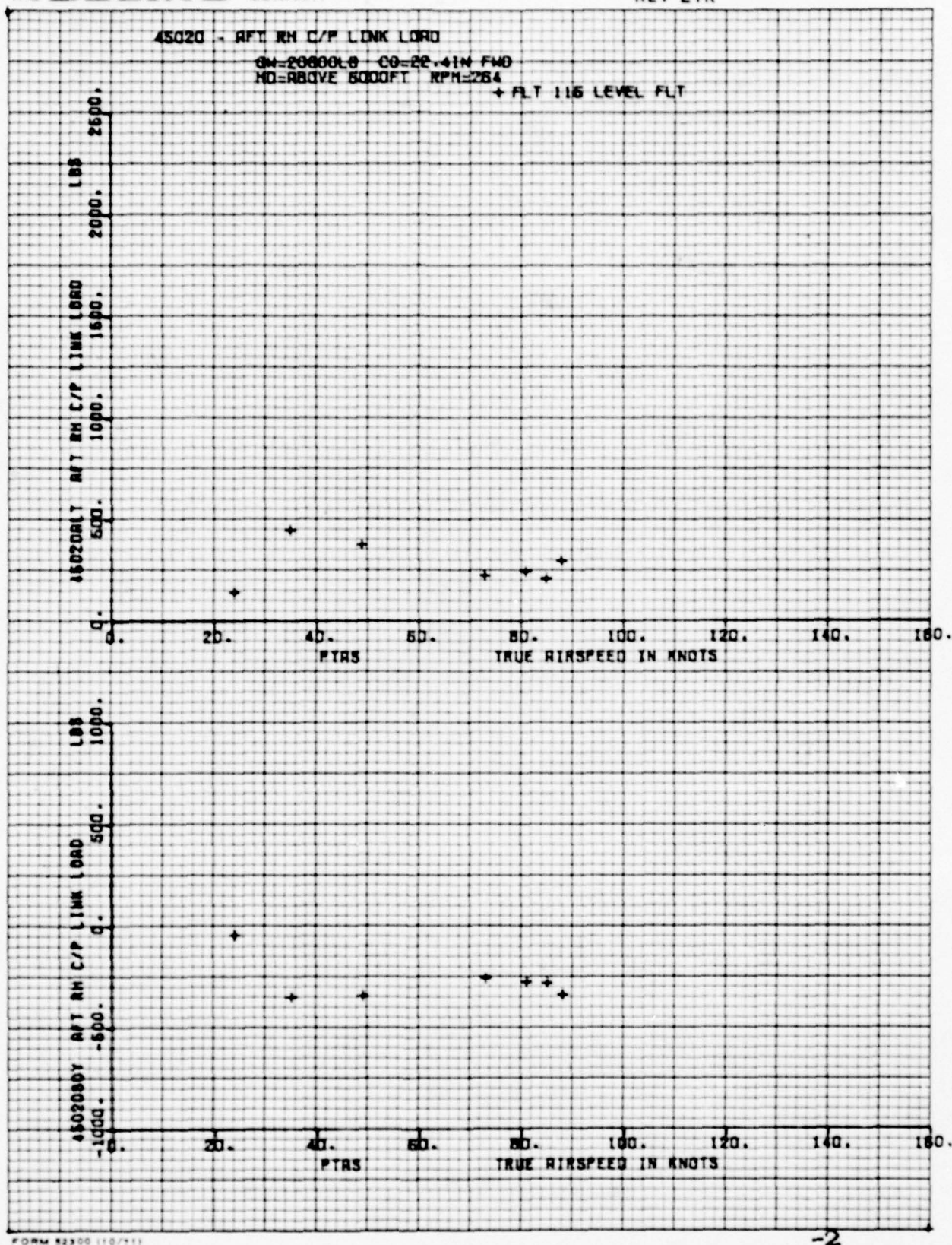
PREPARED BY: J. Bendo
CHECKED BY:
DATE: 8/28/78

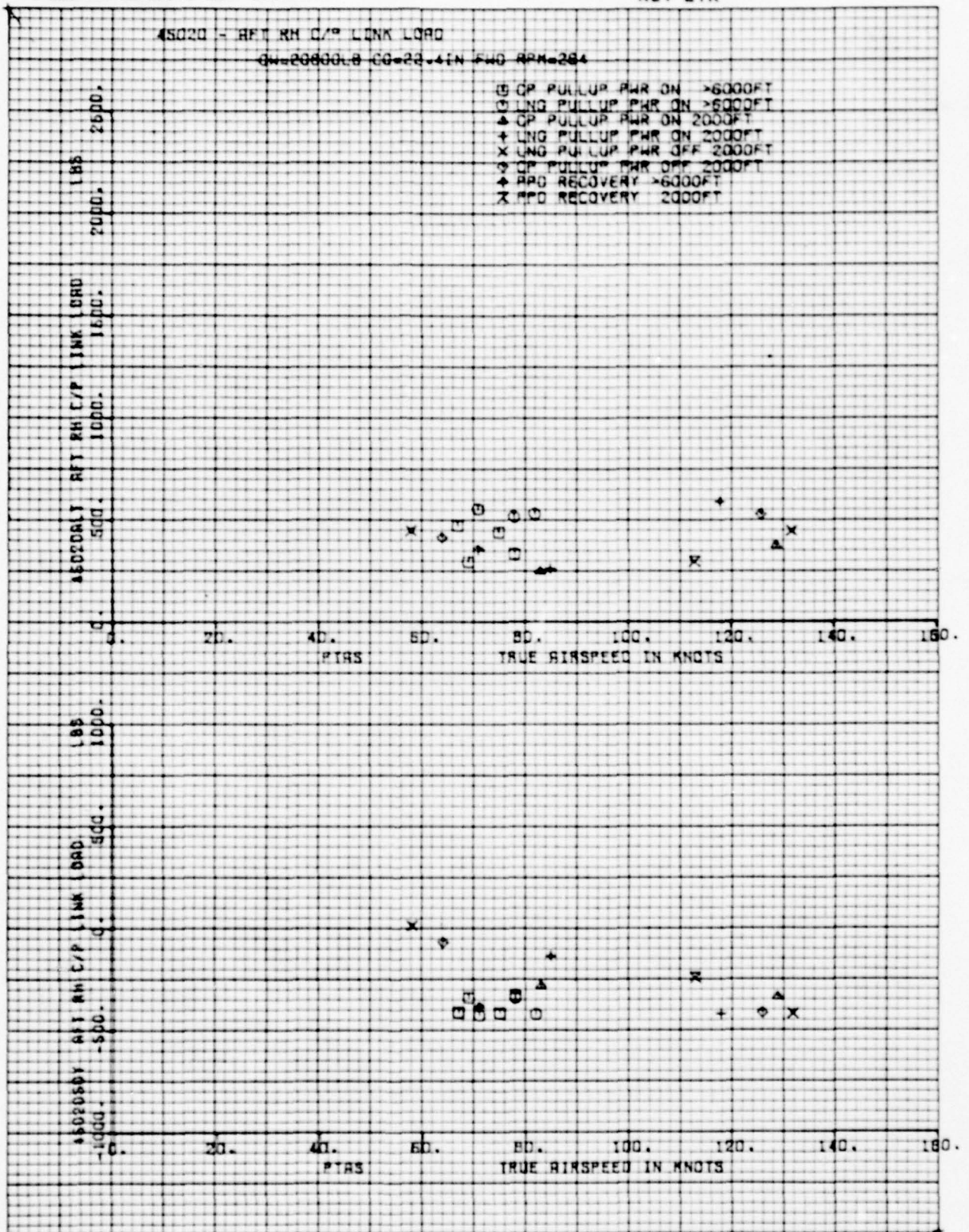
NUMBER D210-11168-3
REV LTR Volume 7
MODEL NO.

4.7 Aft R.H. C/P Link

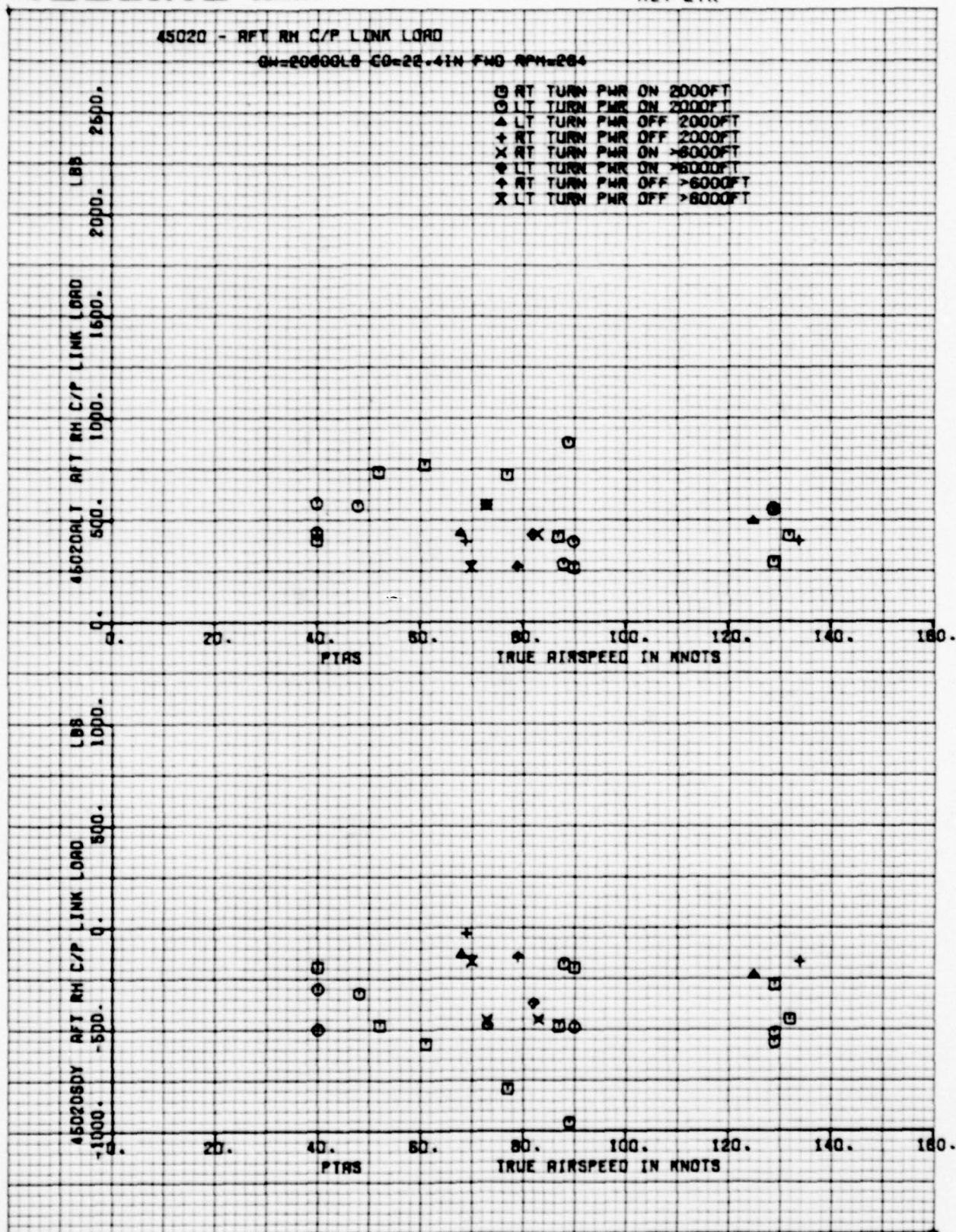


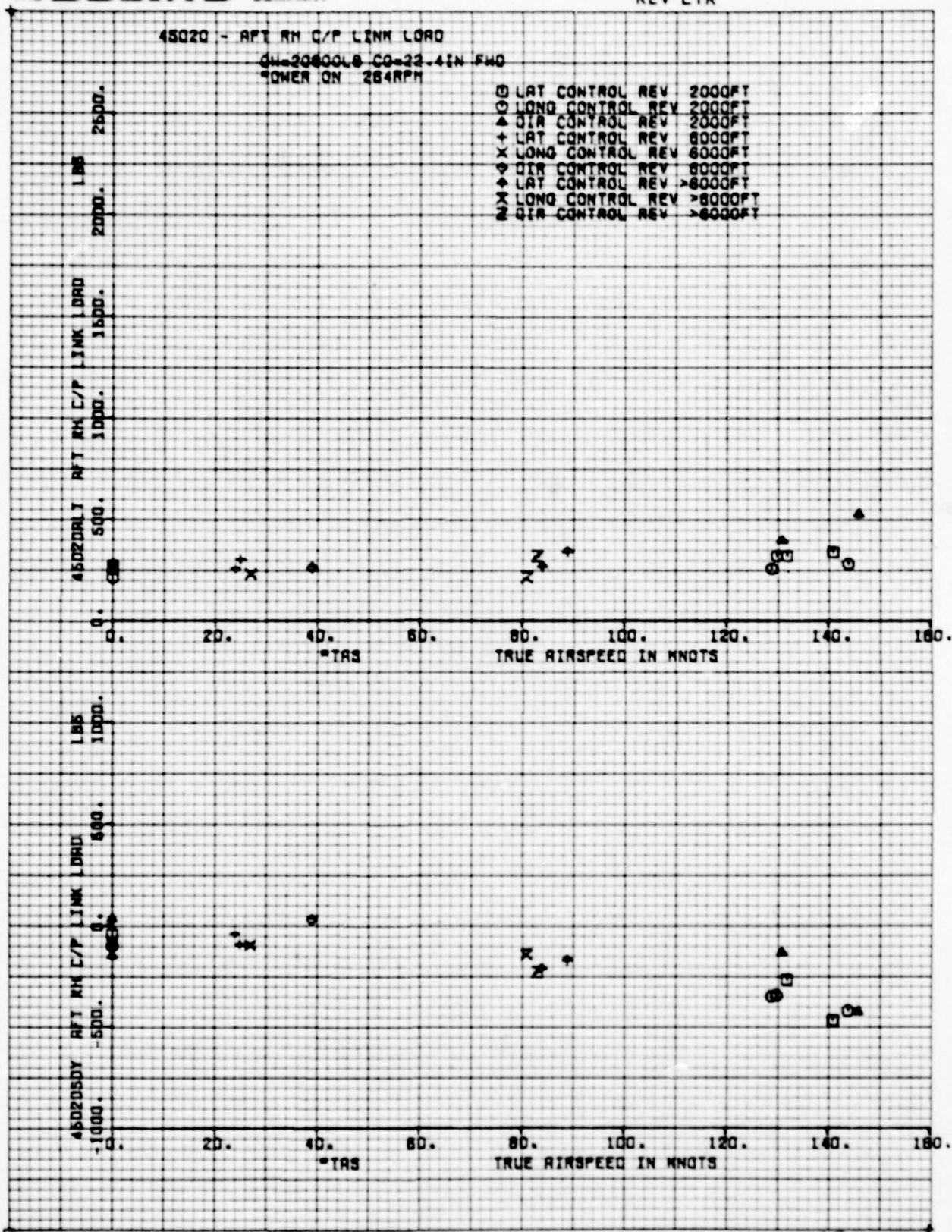
FORM 82500 (10/71)

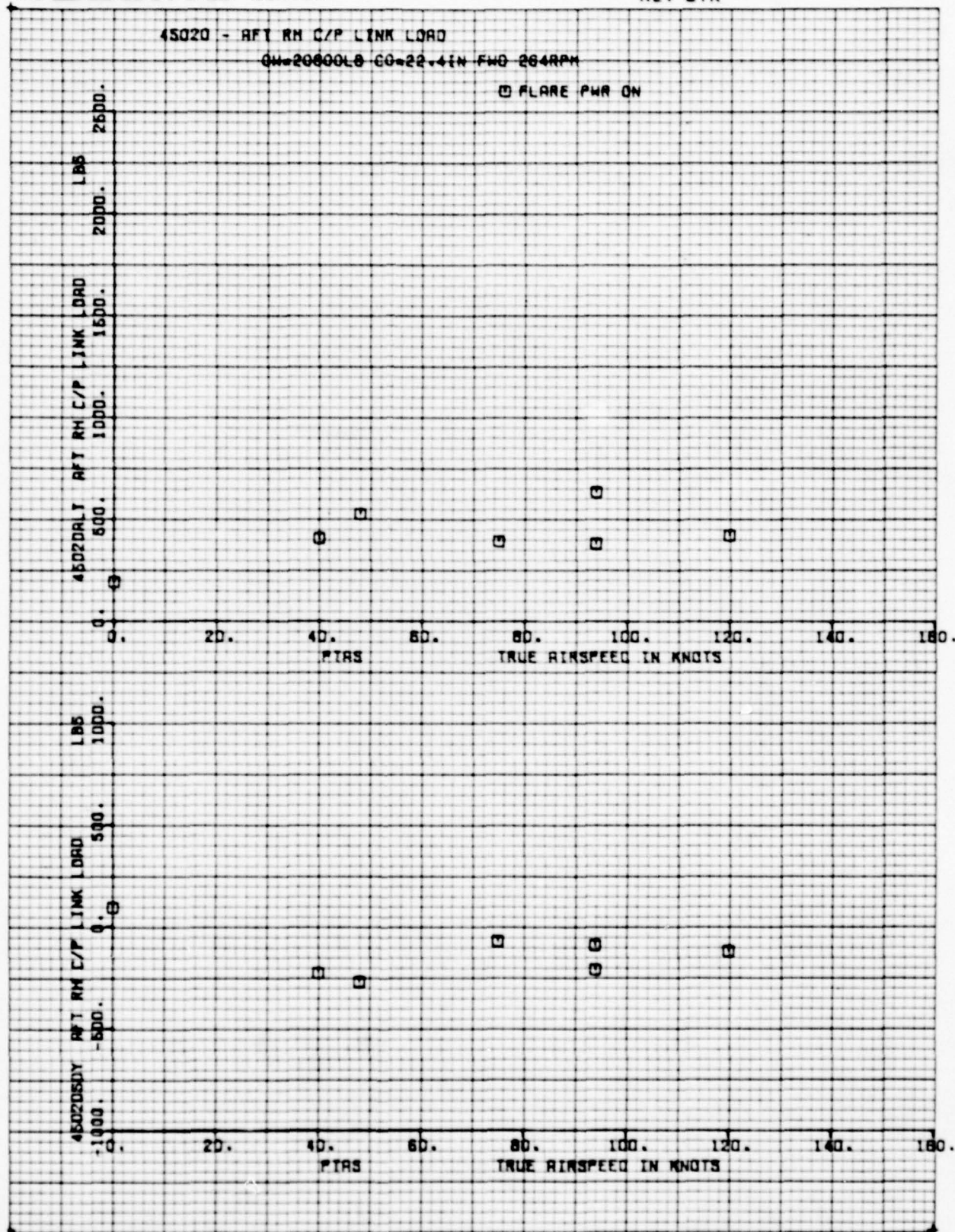




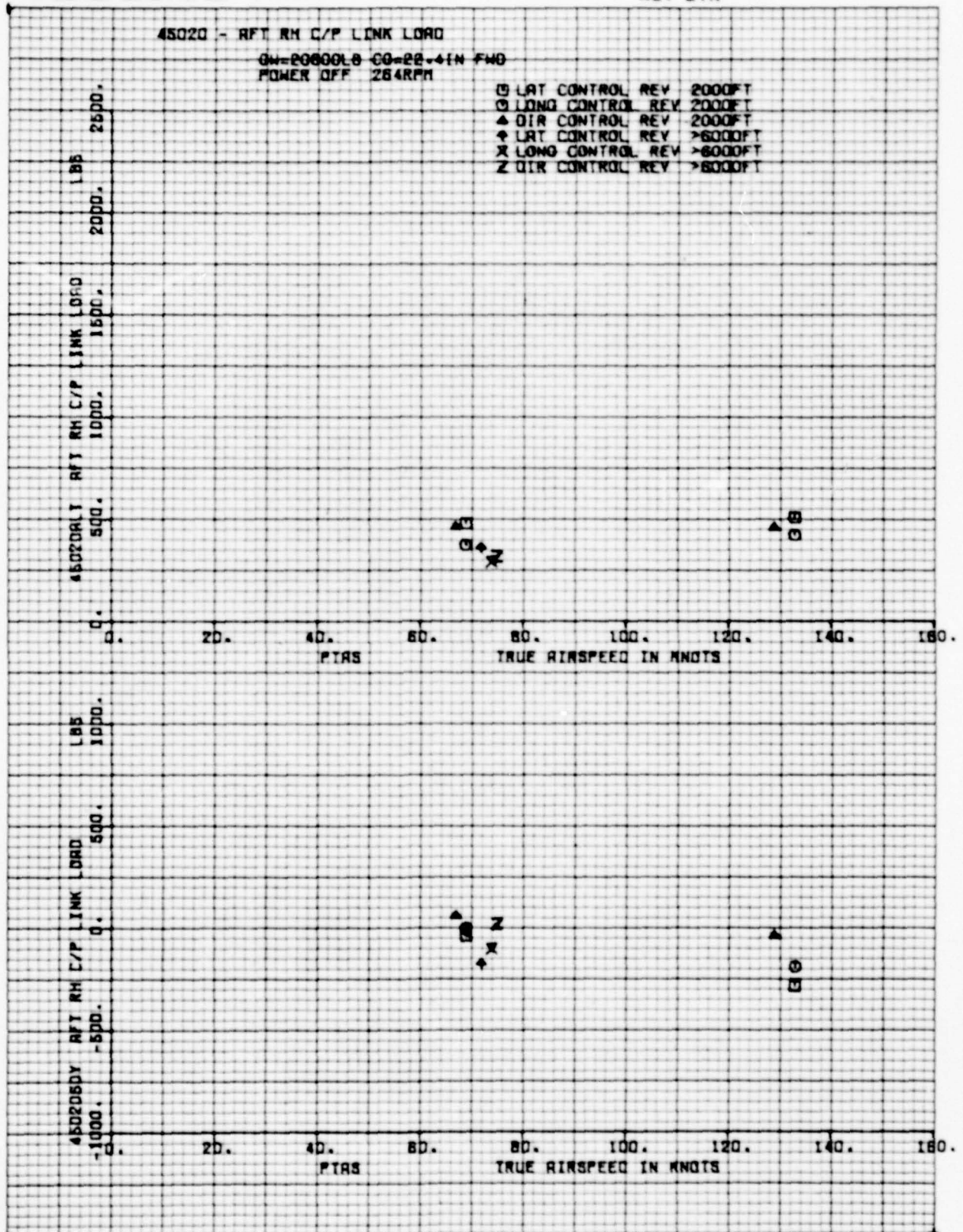
FORM 12300 (10/71)

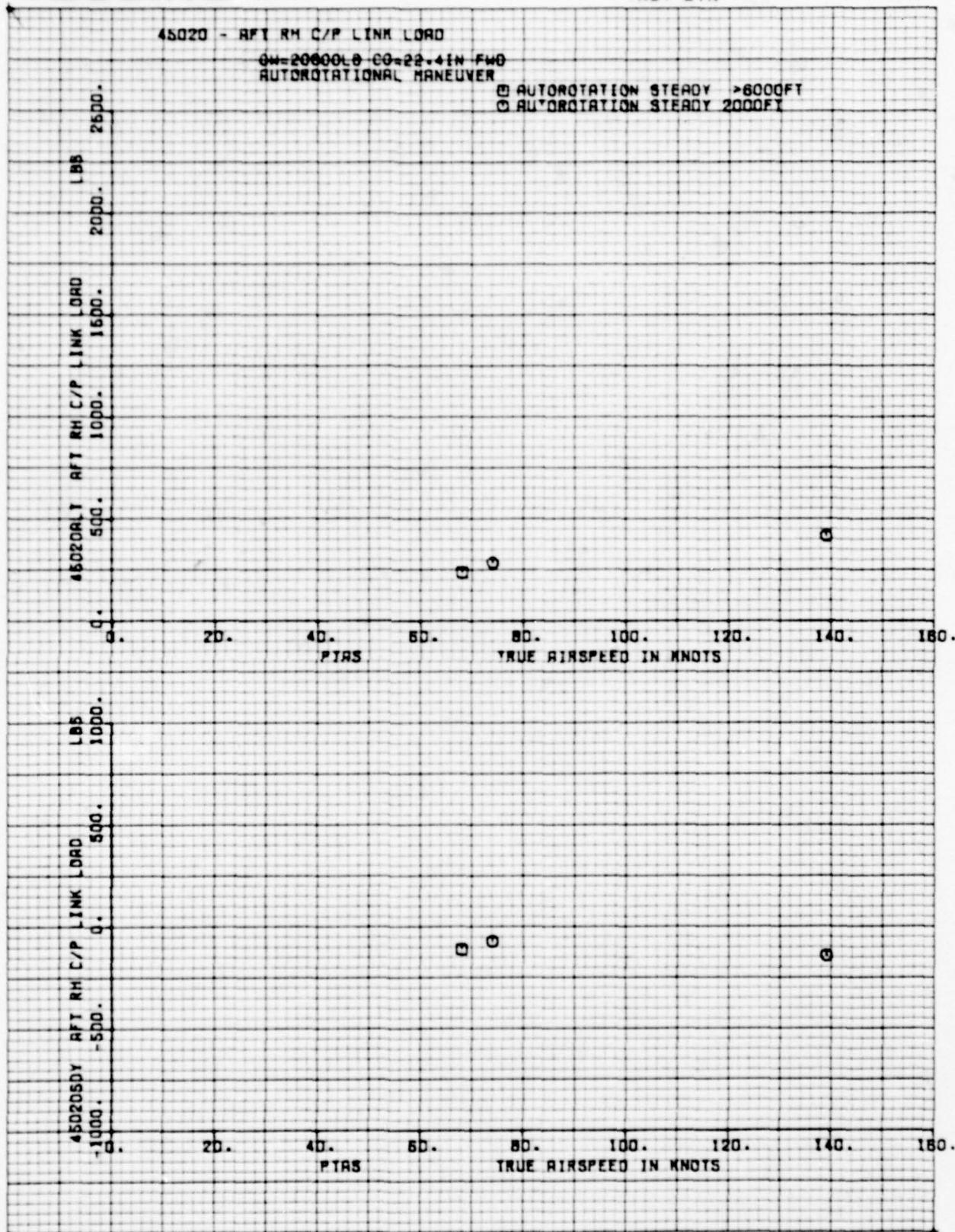




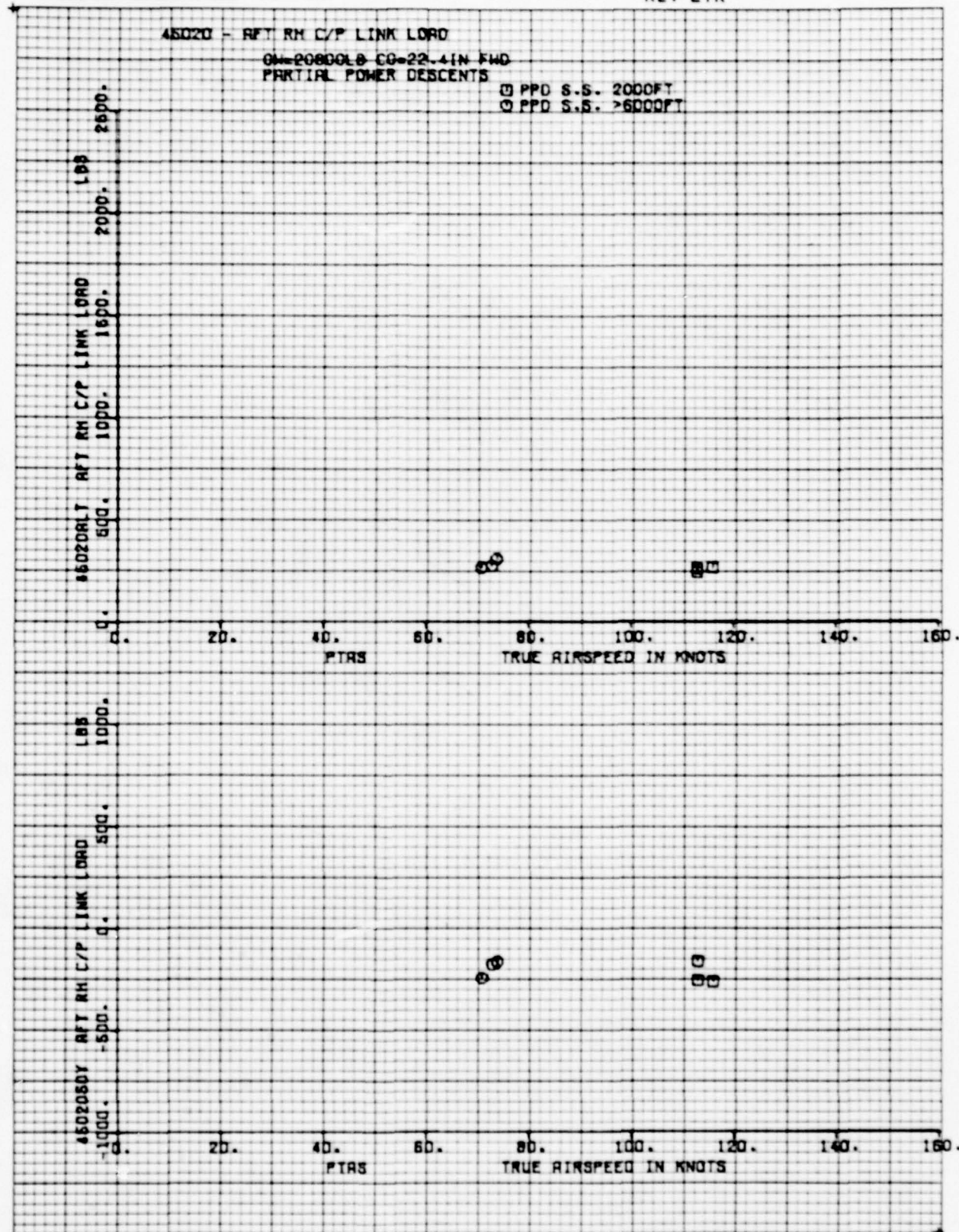


FORM 52300 (10/71)





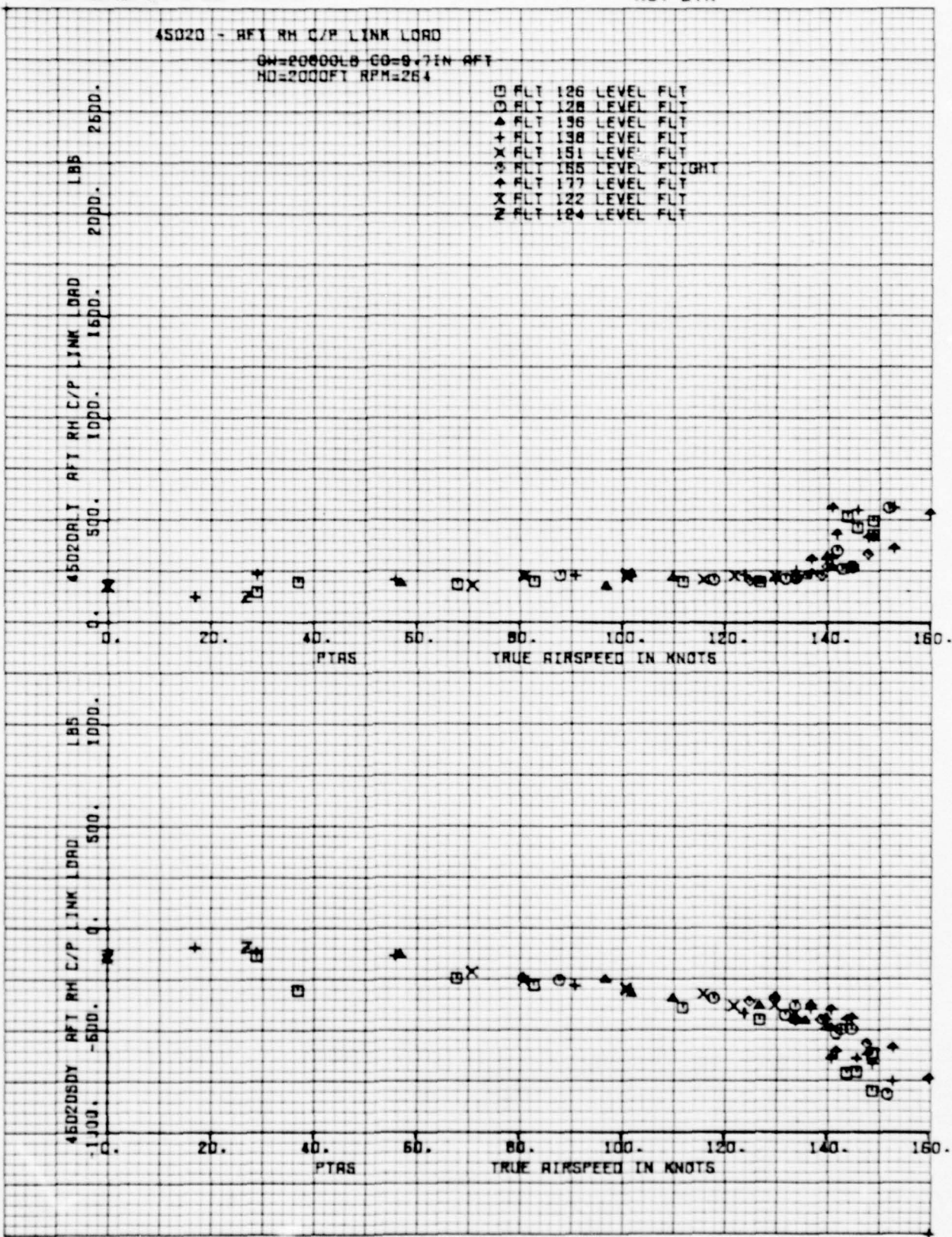
FORM 52300 (10/71)



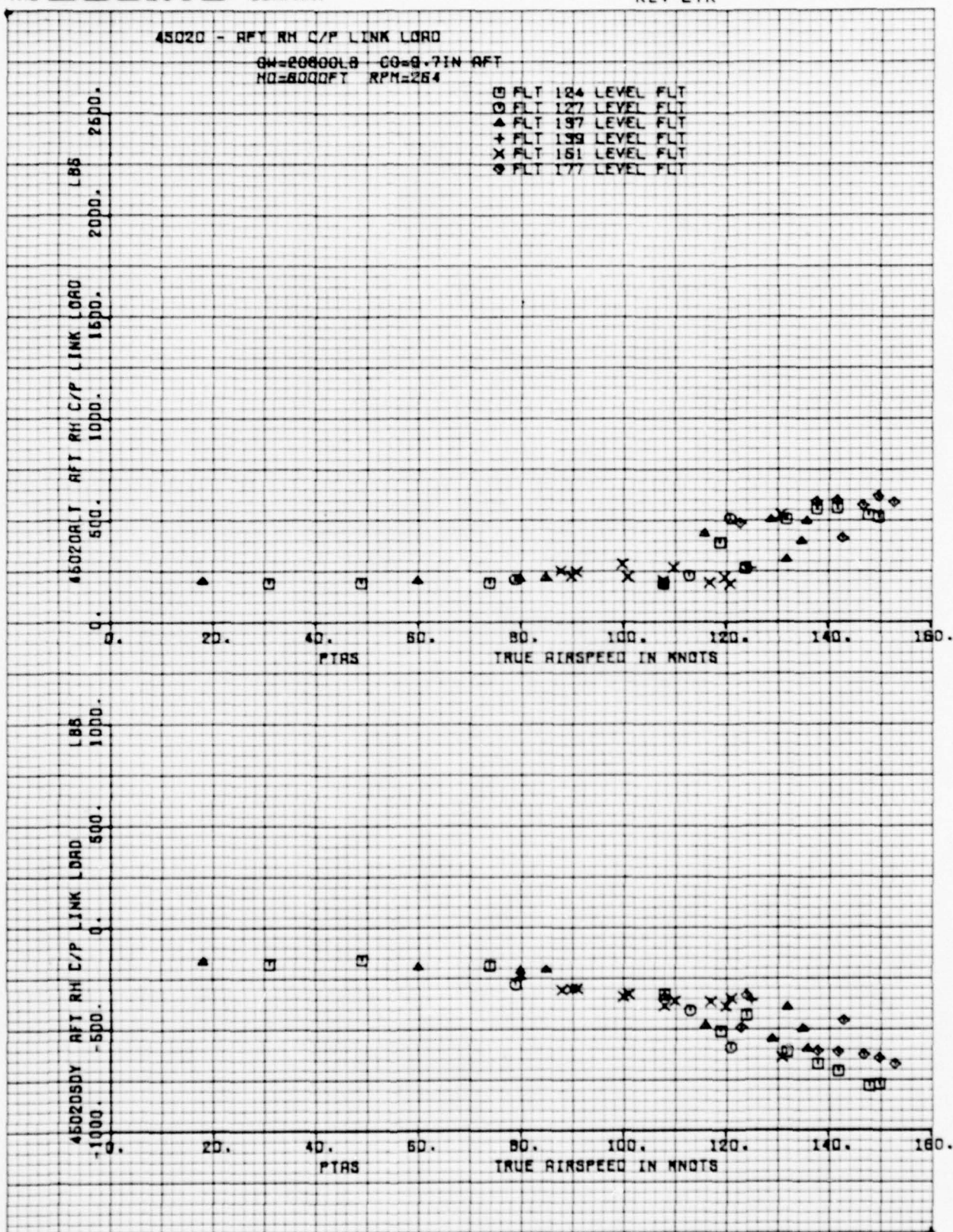
45020 - RFT RH C/P LINK LOAD

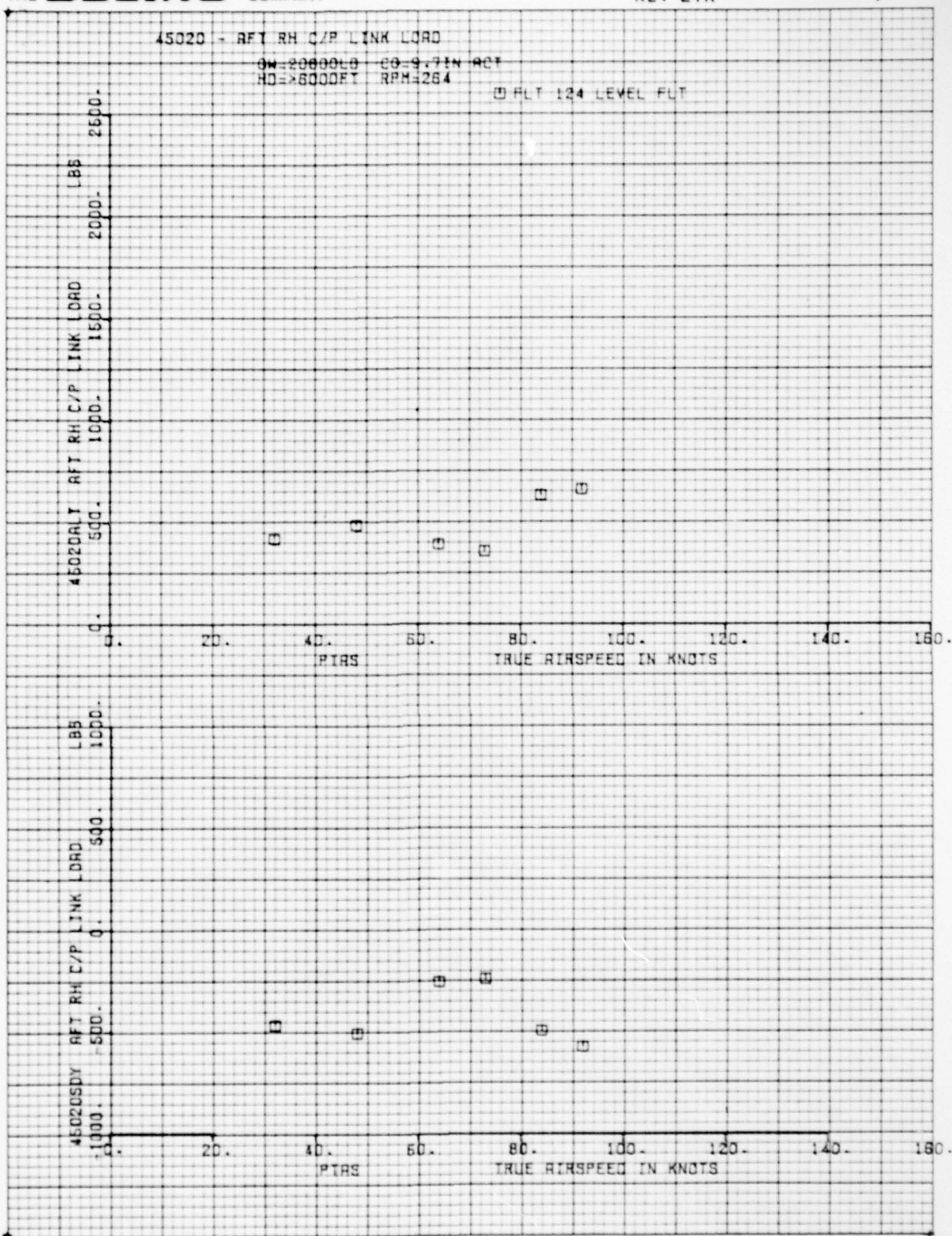
GW=20000LB CG=9.7IN AFT
HD=2000FT RPM=264

- FLT 126 LEVEL FLT
- FLT 128 LEVEL FLT
- ▲ FLT 136 LEVEL FLT
- + FLT 138 LEVEL FLT
- x FLT 151 LEVEL FLT
- ☆ FLT 165 LEVEL FLIGHT
- △ FLT 177 LEVEL FLT
- X FLT 122 LEVEL FLT
- Z FLT 124 LEVEL FLT

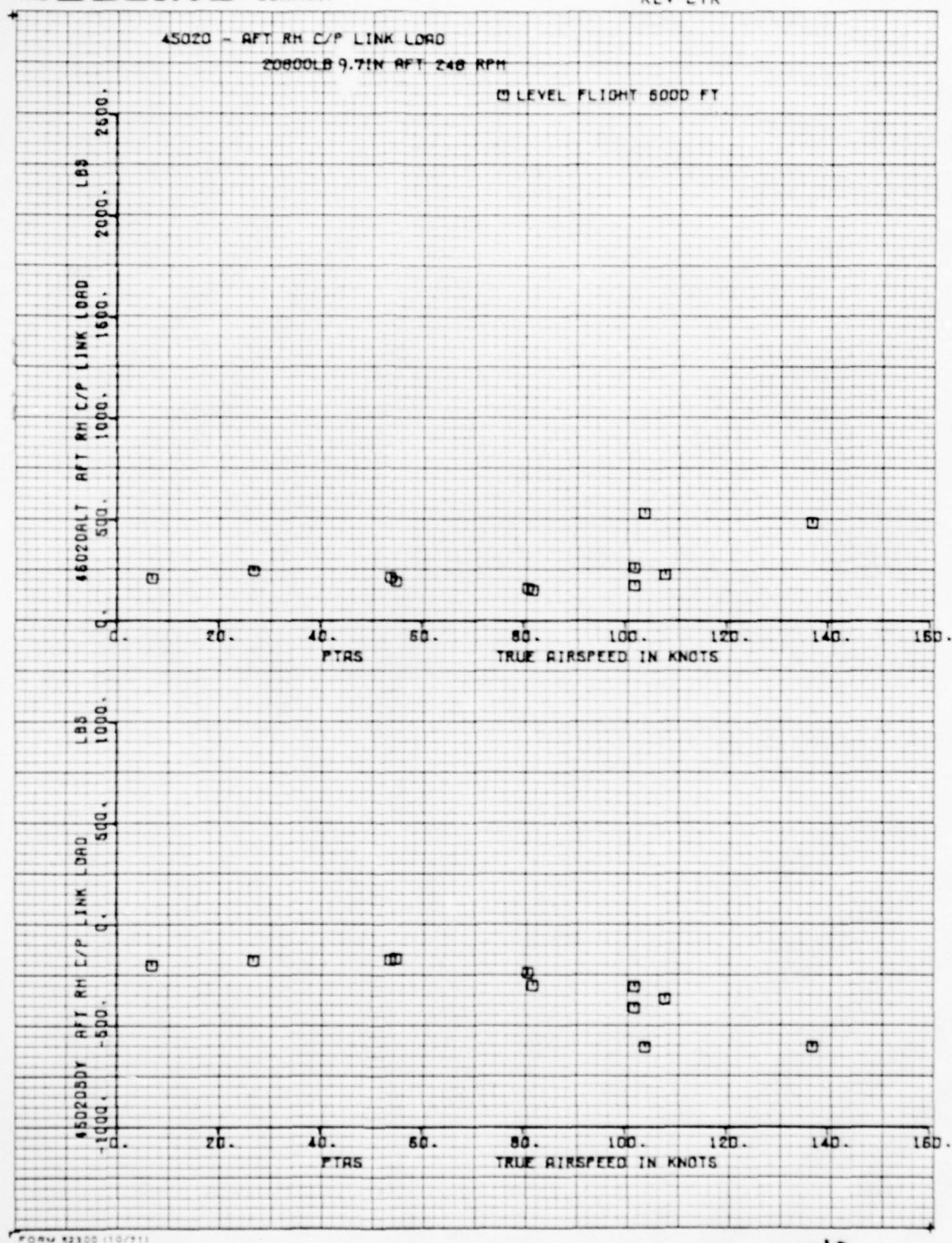


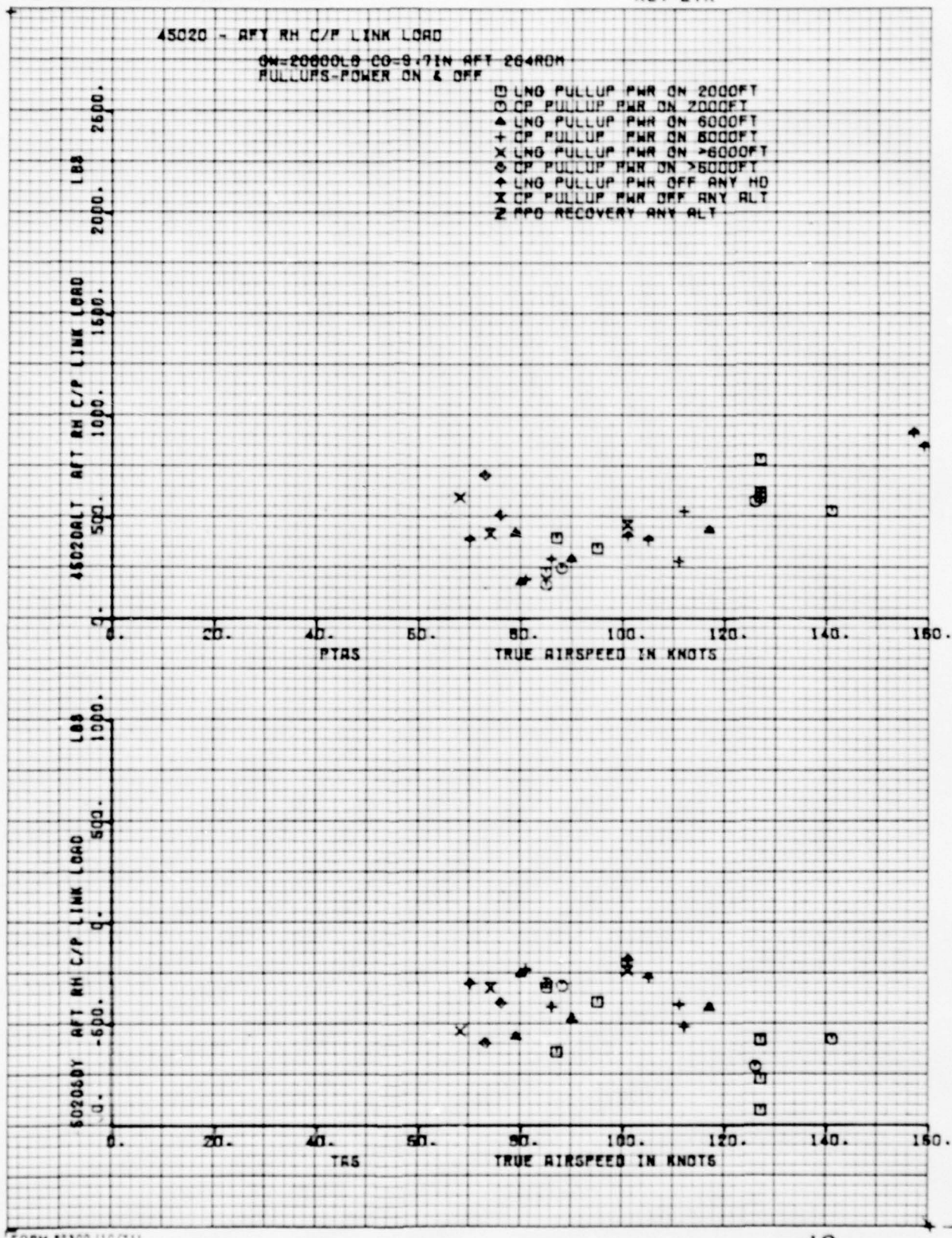
FORM 12300 (10/71)



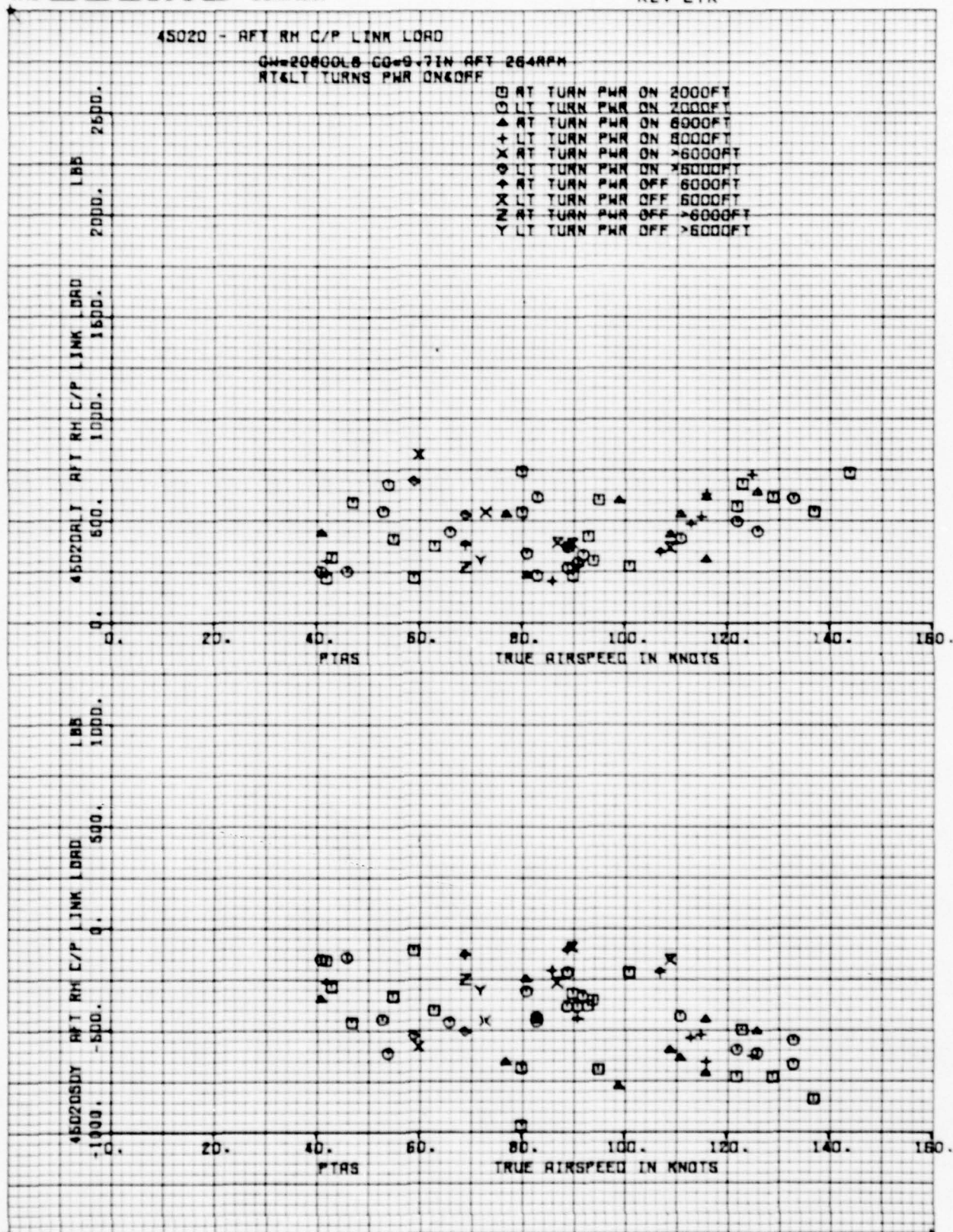


FORM 52300 (10/71)

THE **BOEING** COMPANY

THE **BOEING** COMPANY

FORM 52300 (10/71)

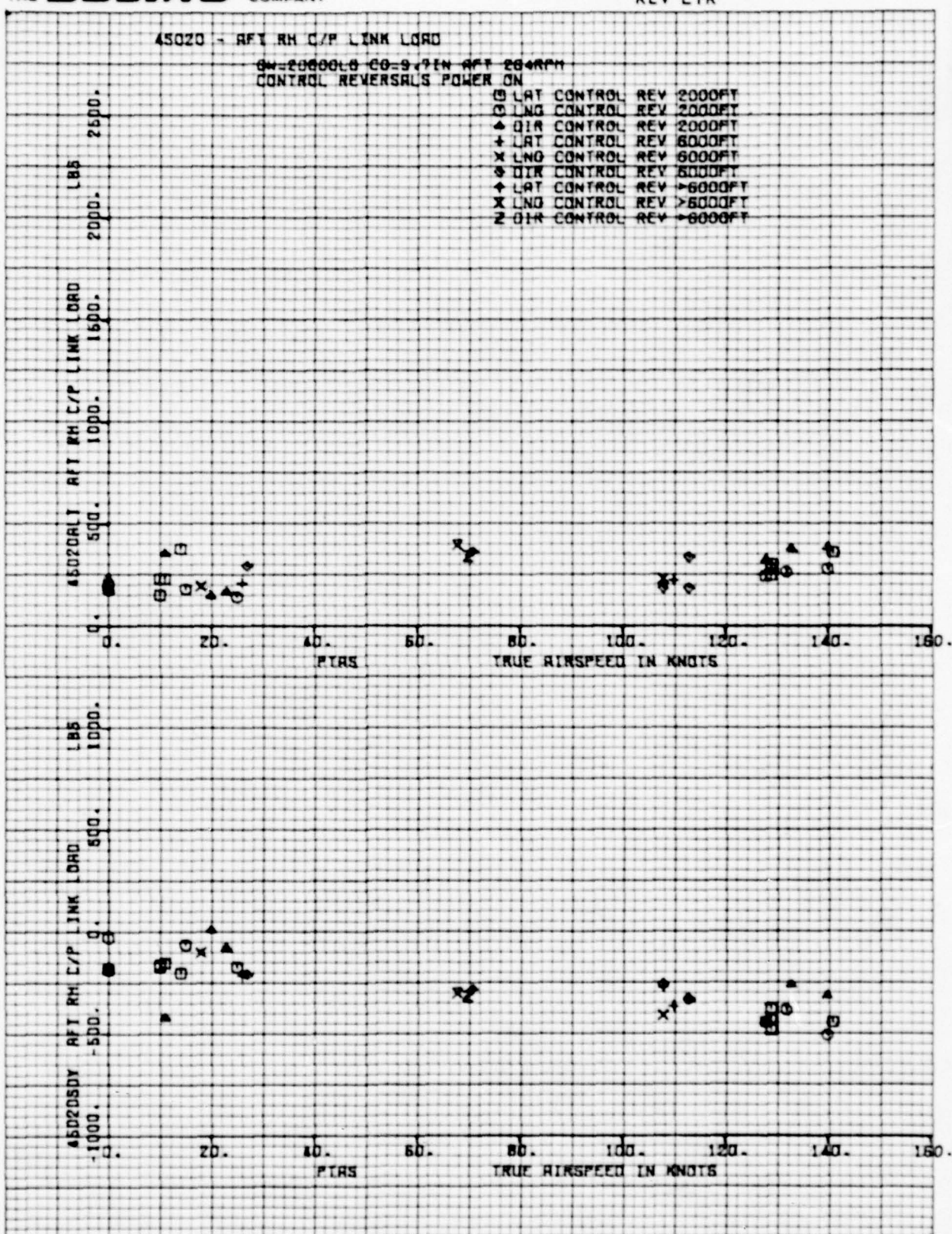


THE **BOEING** COMPANY

45020 - RFT RH C/P LINK LOAD

GM=20000LB CO=9.7IN RFT 284RPM
CONTROL REVERSALS POWER ON

○ LAT CONTROL	REV 2000FT
○ LND CONTROL	REV 2000FT
△ DIR CONTROL	REV 2000FT
† LAT CONTROL	REV 6000FT
× LND CONTROL	REV 6000FT
⊗ DIR CONTROL	REV 6000FT
† LAT CONTROL	REV >6000FT
× LND CONTROL	REV >6000FT
⊗ DIR CONTROL	REV >6000FT



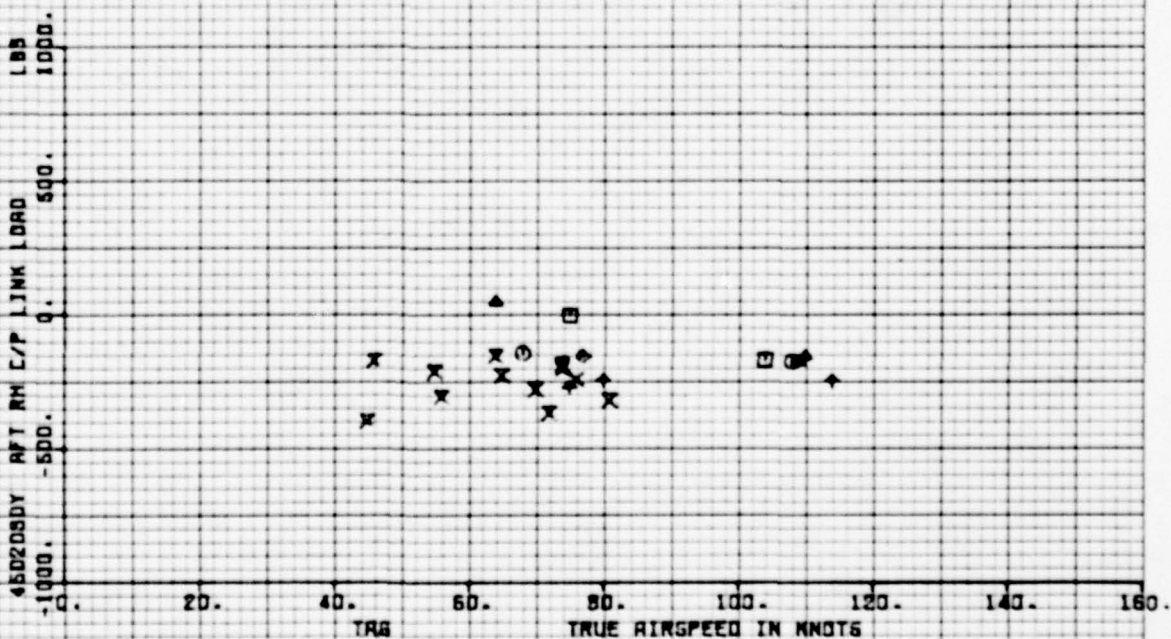
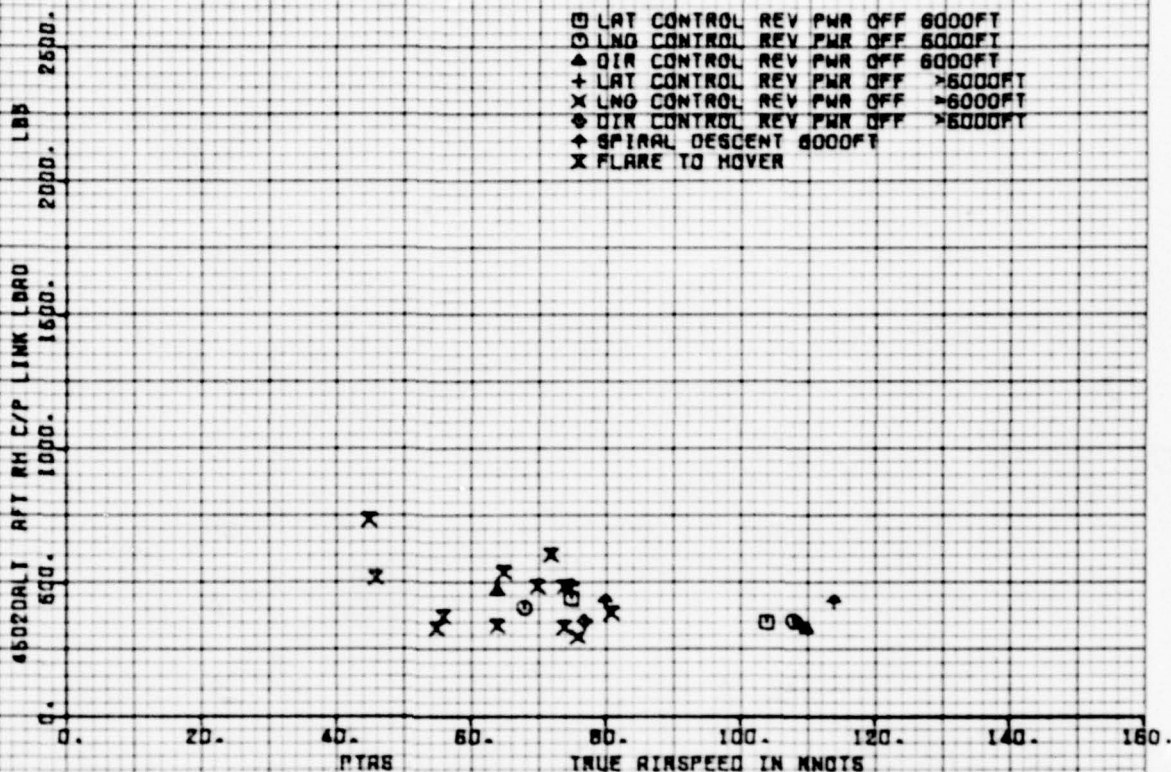
FORM 52300 (10/71)

THE **BOEING** COMPANY

45020 - AFT RH C/P LINK LOAD

GW=20000LB GO=9.71N AFT 264RPM

- LAT CONTROL REV PWR OFF 6000FT
 ○ LND CONTROL REV PWR OFF 6000FT
 ▲ DIR CONTROL REV PWR OFF 6000FT
 + LAT CONTROL REV PWR OFF >6000FT
 × LND CONTROL REV PWR OFF >6000FT
 ◆ DIR CONTROL REV PWR OFF >6000FT
 ♦ SPIRAL DESCENT 6000FT
 X FLARE TO HOVER

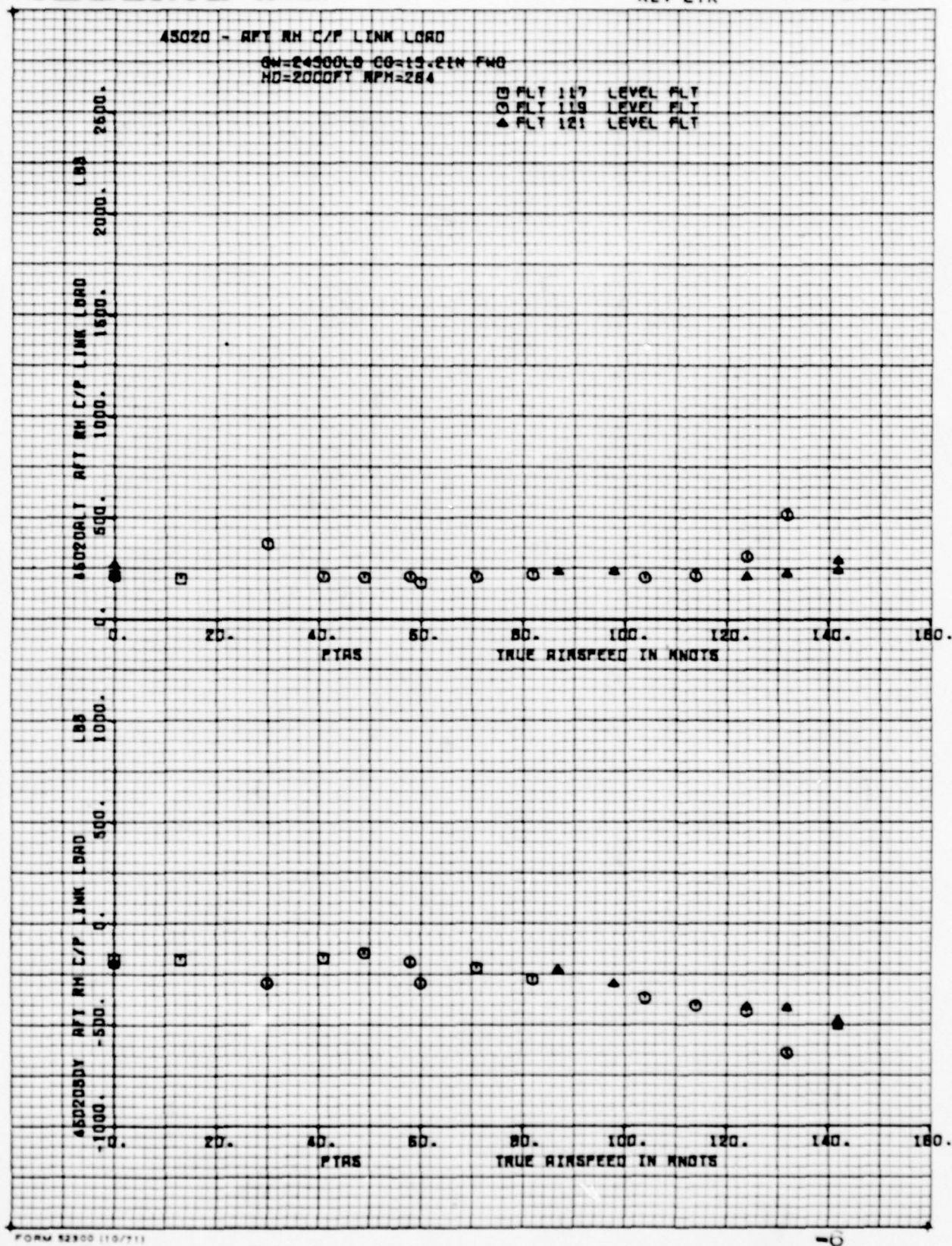


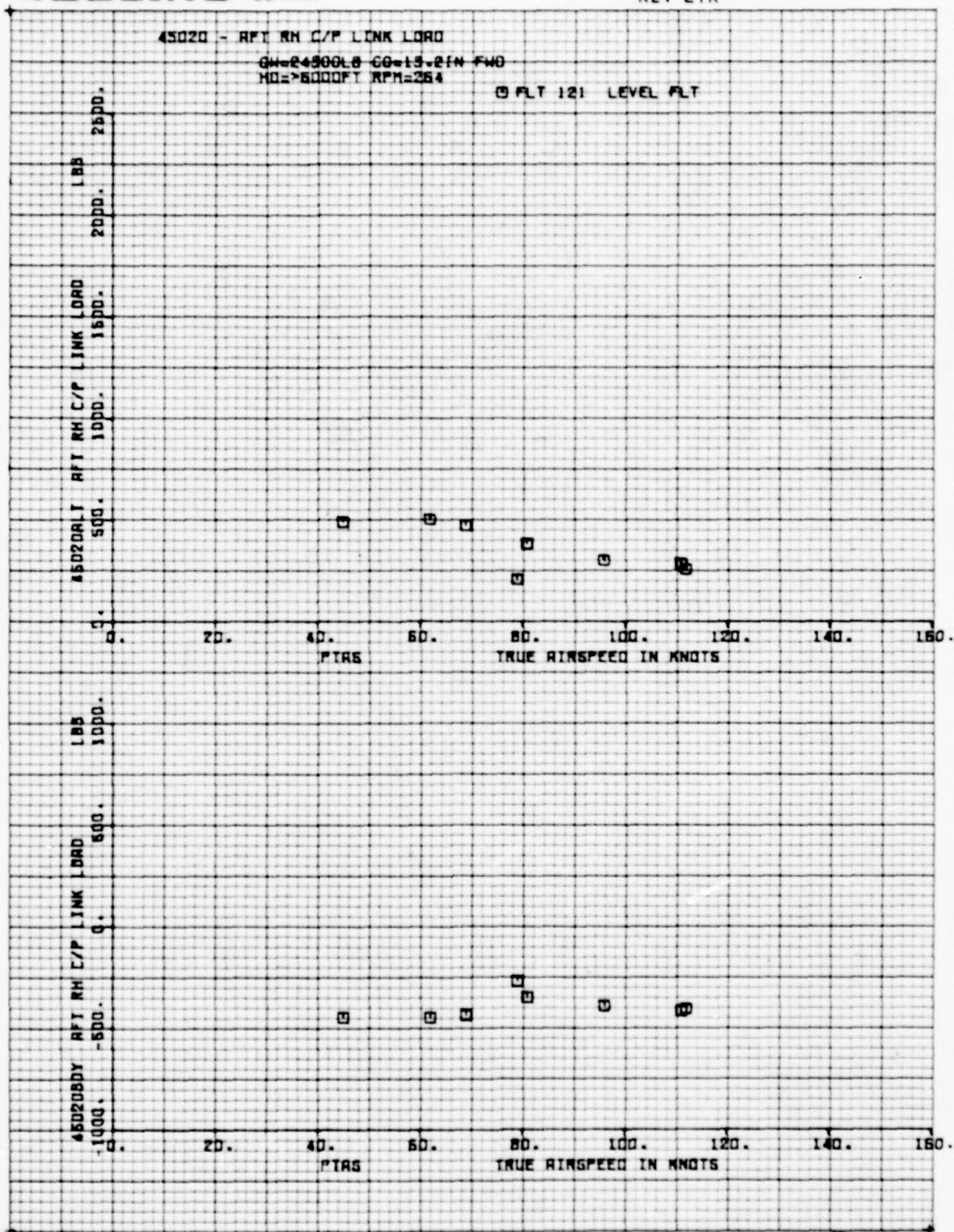
45020 - AFT RH C/P LINK LOAD
 GW=20800LB CG=9.7IN AFT 264RPM

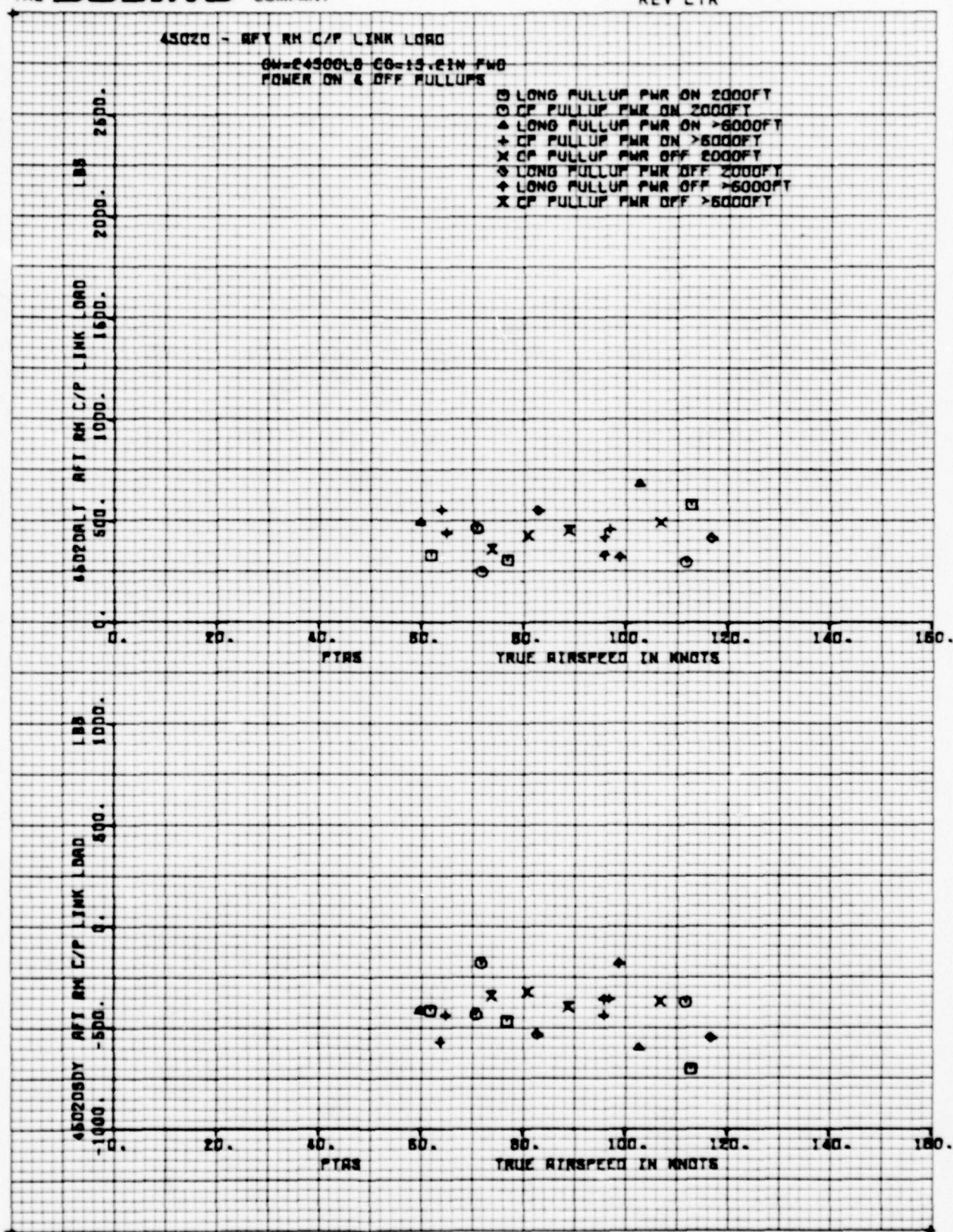
Legend:
 □ R/R STEADY 6000FT
 ○ R/R STEADY >6000FT
 ▲ PFD 6000FT
 + PFD >6000FT

Top Plot (45020):
 Y-axis: 45020AFT AFT RH C/P LINK LOAD (0 to 2500 LBS)
 X-axis: TRUE AIRSPEED IN KNOTS (0 to 160)
 Data points are clustered around 600-700 LBS load across the airspeed range.

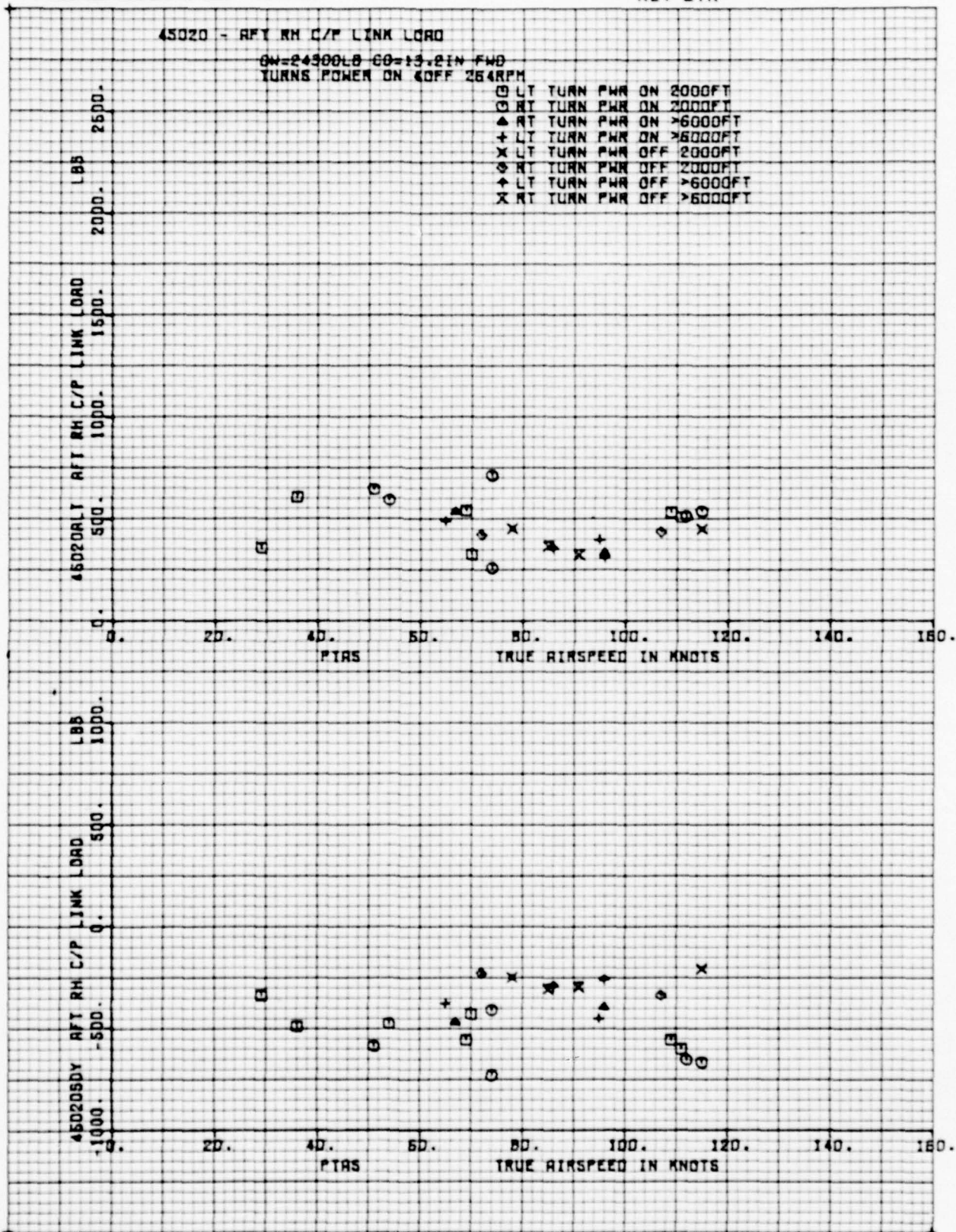
Bottom Plot (45020SDY):
 Y-axis: 45020SDY AFT RH C/P LINK LOAD (0 to 1000 LBS)
 X-axis: TRUE AIRSPEED IN KNOTS (0 to 160)
 Data points are clustered around 200-300 LBS load across the airspeed range.

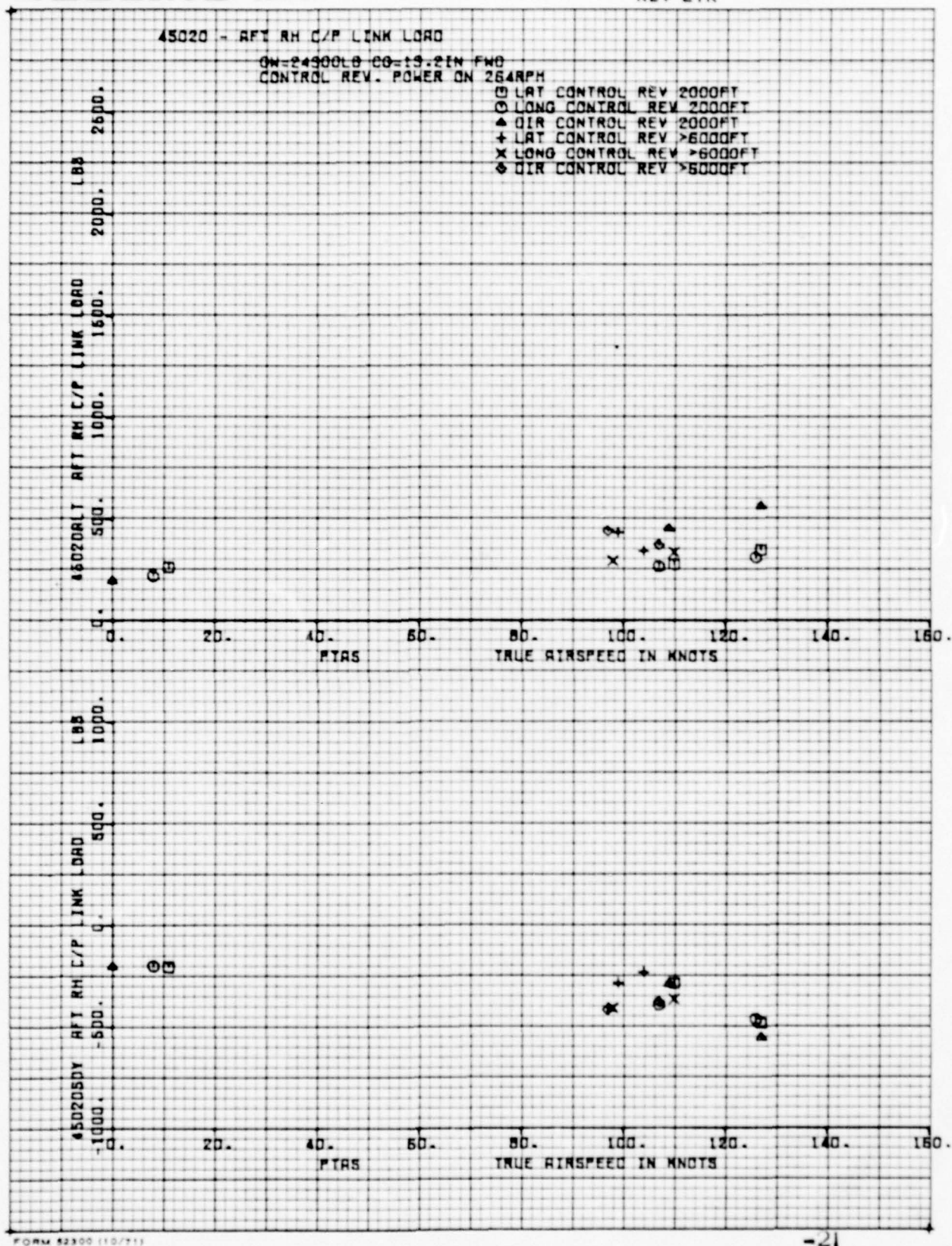


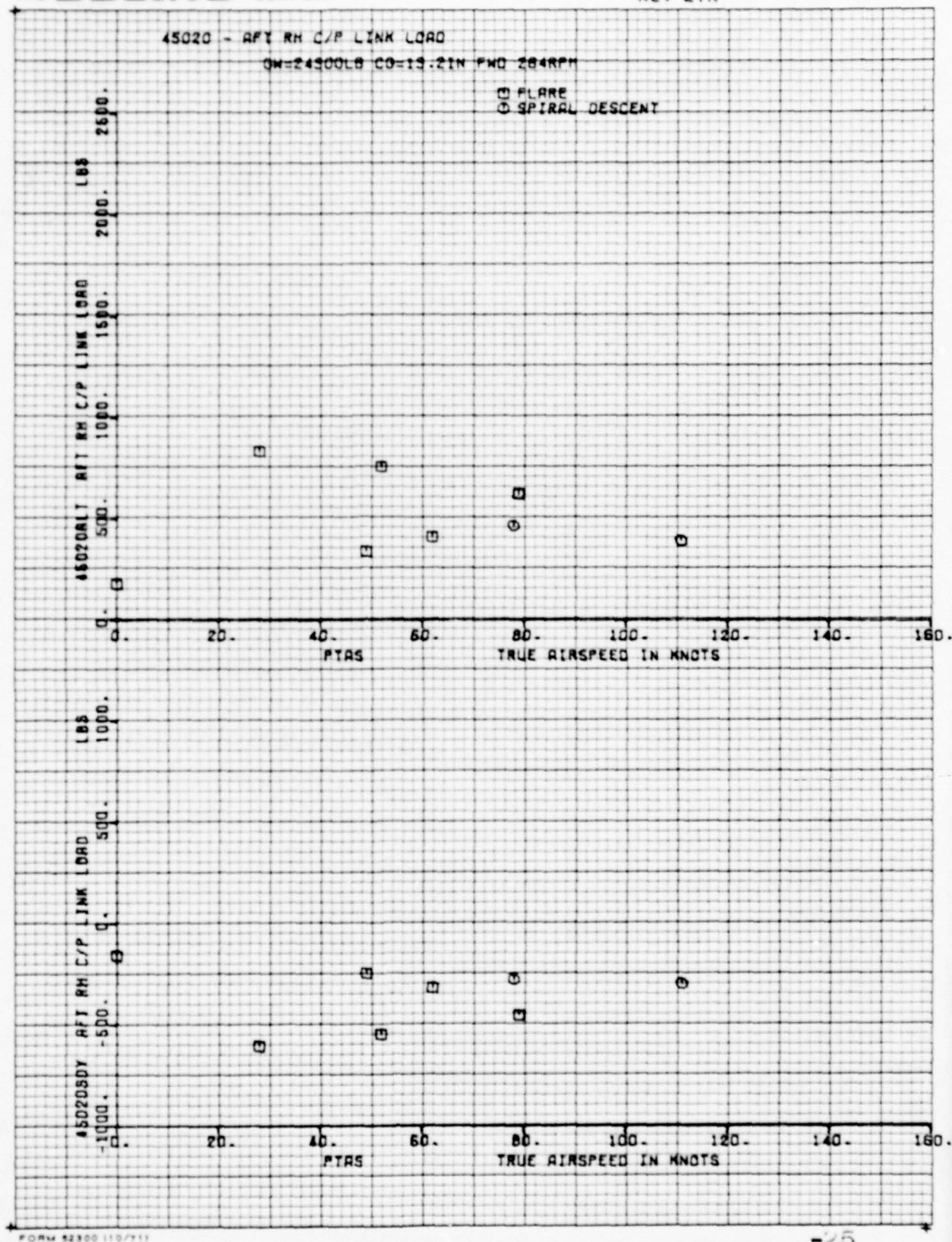


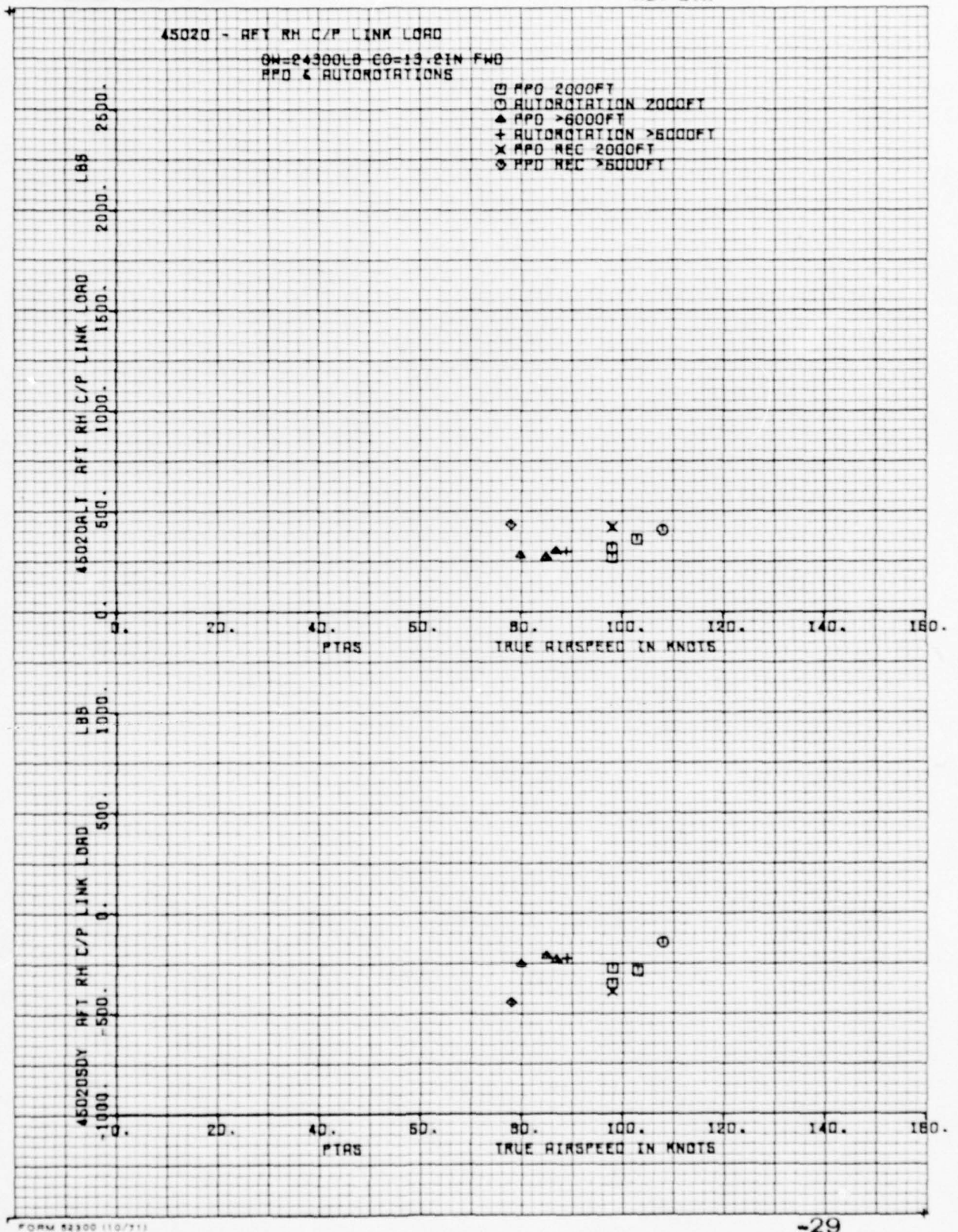
THE **BOEING** COMPANY

FORM 52300 (10/71)

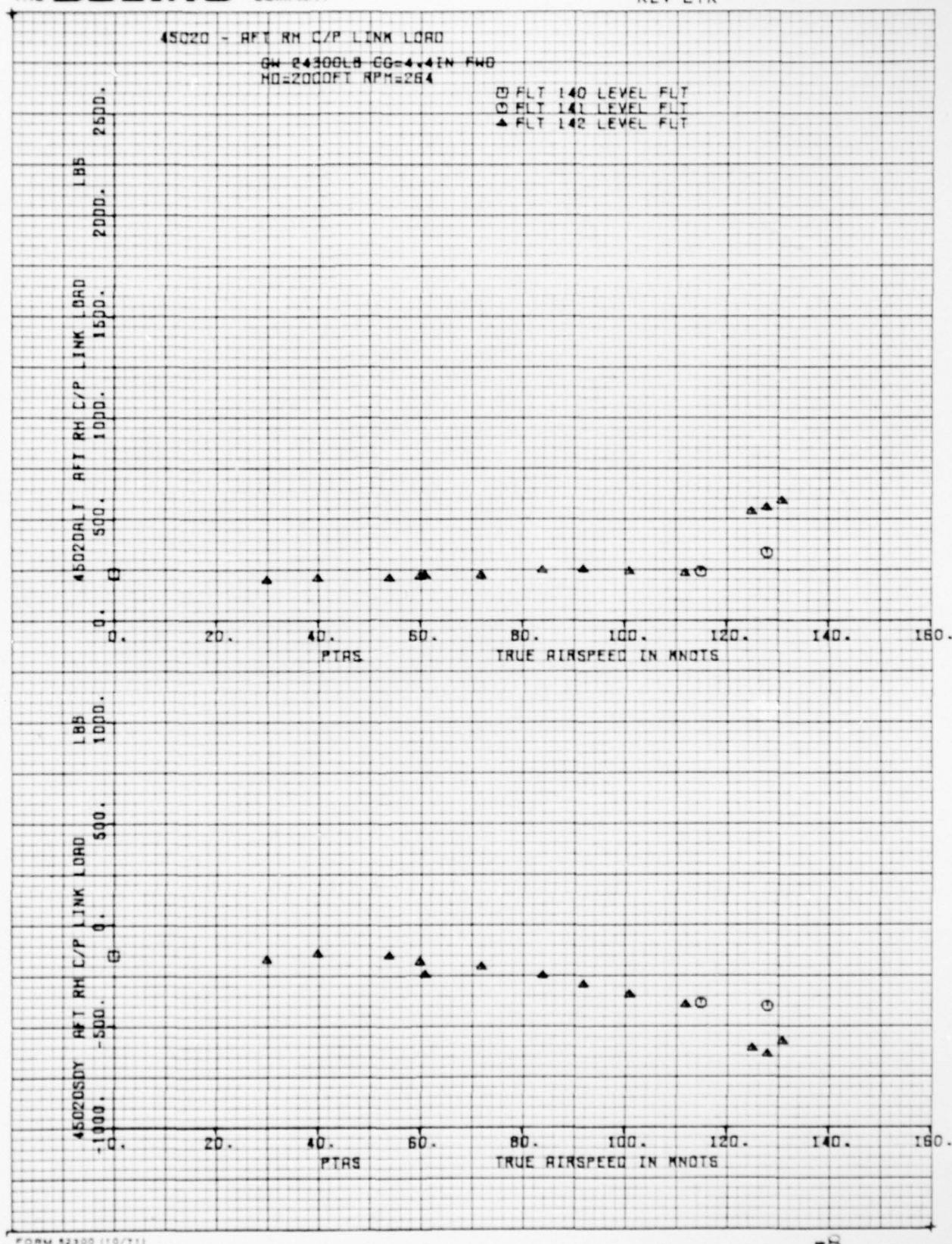




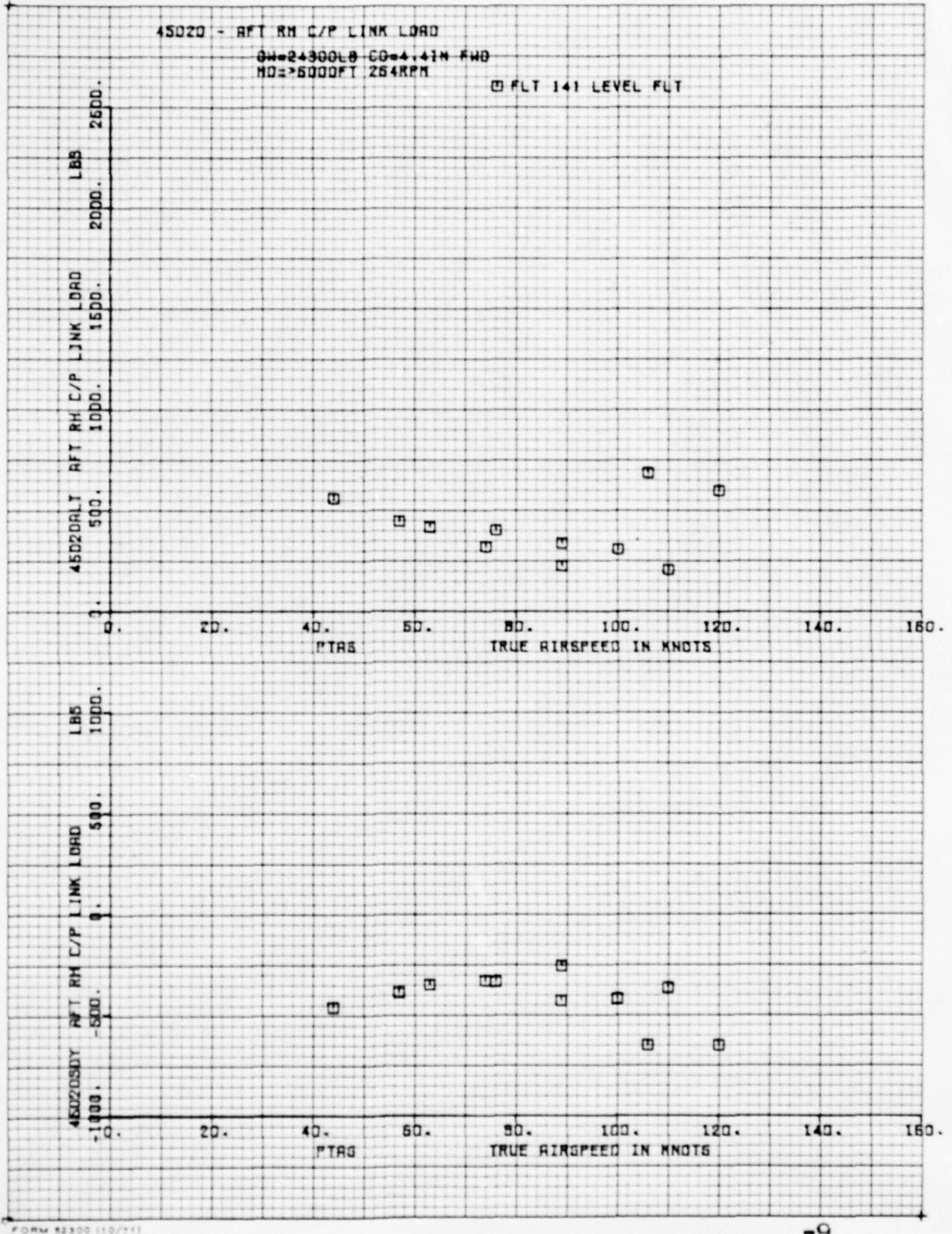




THE **BOEING** COMPANY



FORM 52300 (10/71)



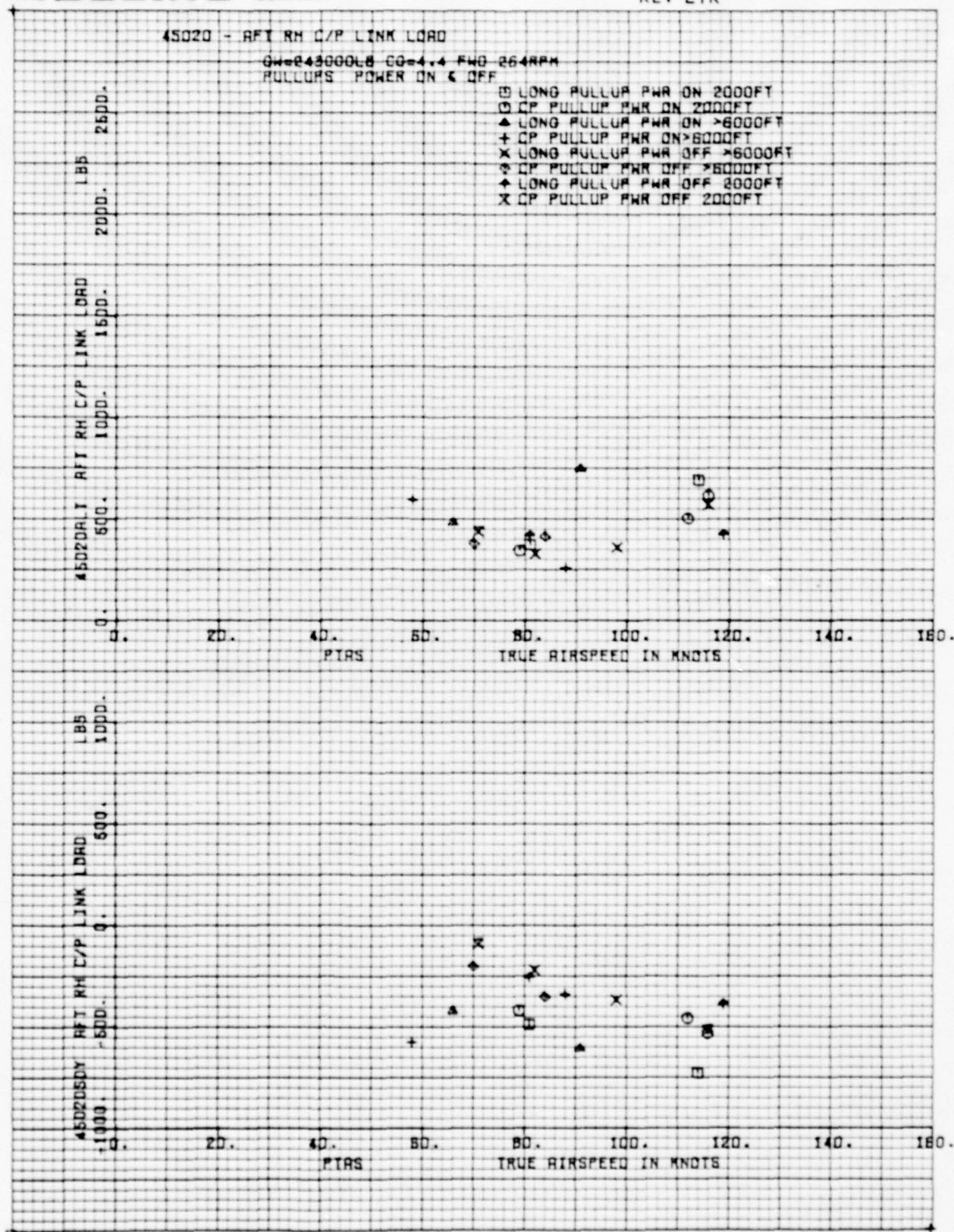
FORM 52300 (10/71)

THE **BOEING** COMPANY

45020 - RFT RH C/P LINK LOAD

GW=24300LB GO=4.4 FWD 264RPM
PULLUPS POWER ON & OFF

- ⊖ LONG PULLUP PWR ON 2000FT
- ⊙ CP PULLUP PWR ON 2000FT
- ▲ LONG PULLUP PWR ON >6000FT
- + CP PULLUP PWR ON >6000FT
- × LONG PULLUP PWR OFF >6000FT
- ⊕ CP PULLUP PWR OFF >6000FT
- ⬆ LONG PULLUP PWR OFF 2000FT
- × CP PULLUP PWR OFF 2000FT



FORM 52300 (12/71)

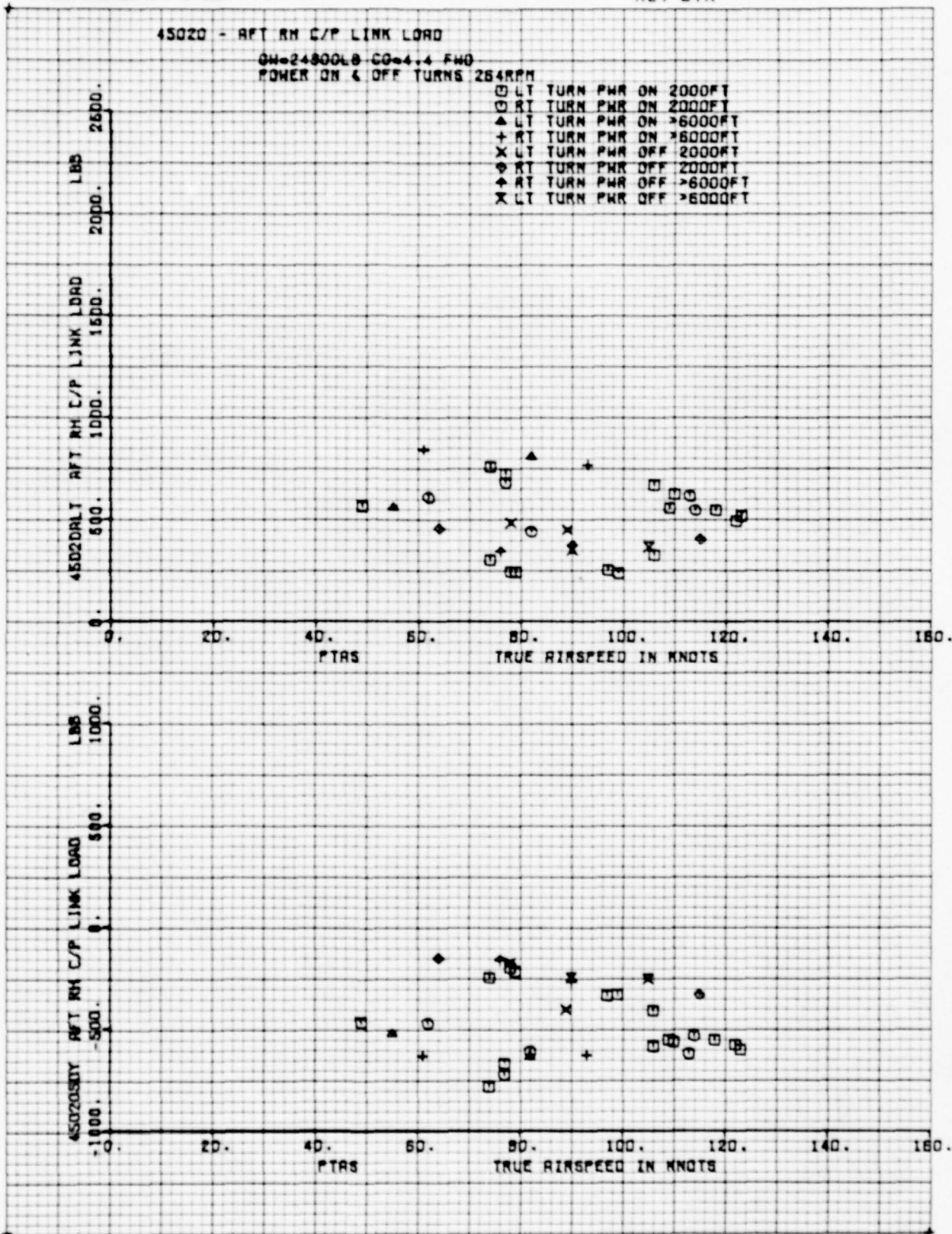
THE **BOEING** COMPANY

45020 - AFT RH C/P LINK LOAD

QW-24800LB GO-4.4 FWD

POWER ON & OFF TURNS 264RPM

O LT TURN PWR ON 2000FT
 O RT TURN PWR ON 2000FT
 ▲ LT TURN PWR ON >6000FT
 + RT TURN PWR ON >6000FT
 X LT TURN PWR OFF 2000FT
 O RT TURN PWR OFF 2000FT
 + RT TURN PWR OFF >6000FT
 X LT TURN PWR OFF >6000FT



FORM 82300 (10/71)

-18

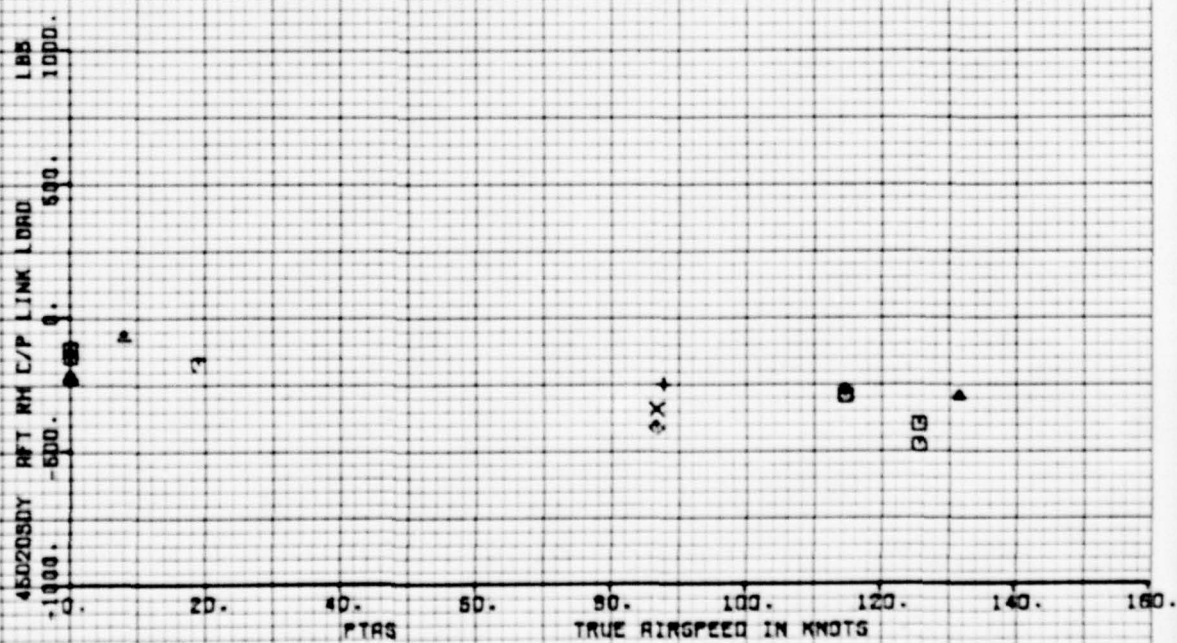
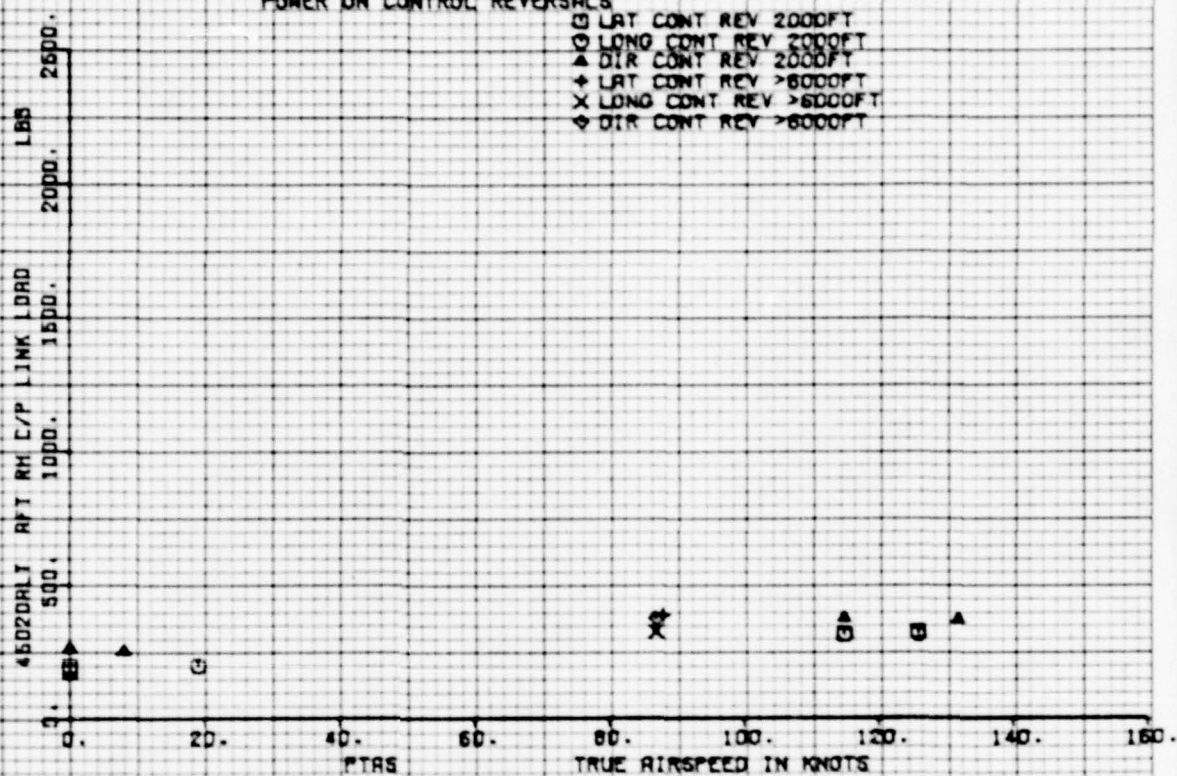
THE **BOEING** COMPANY

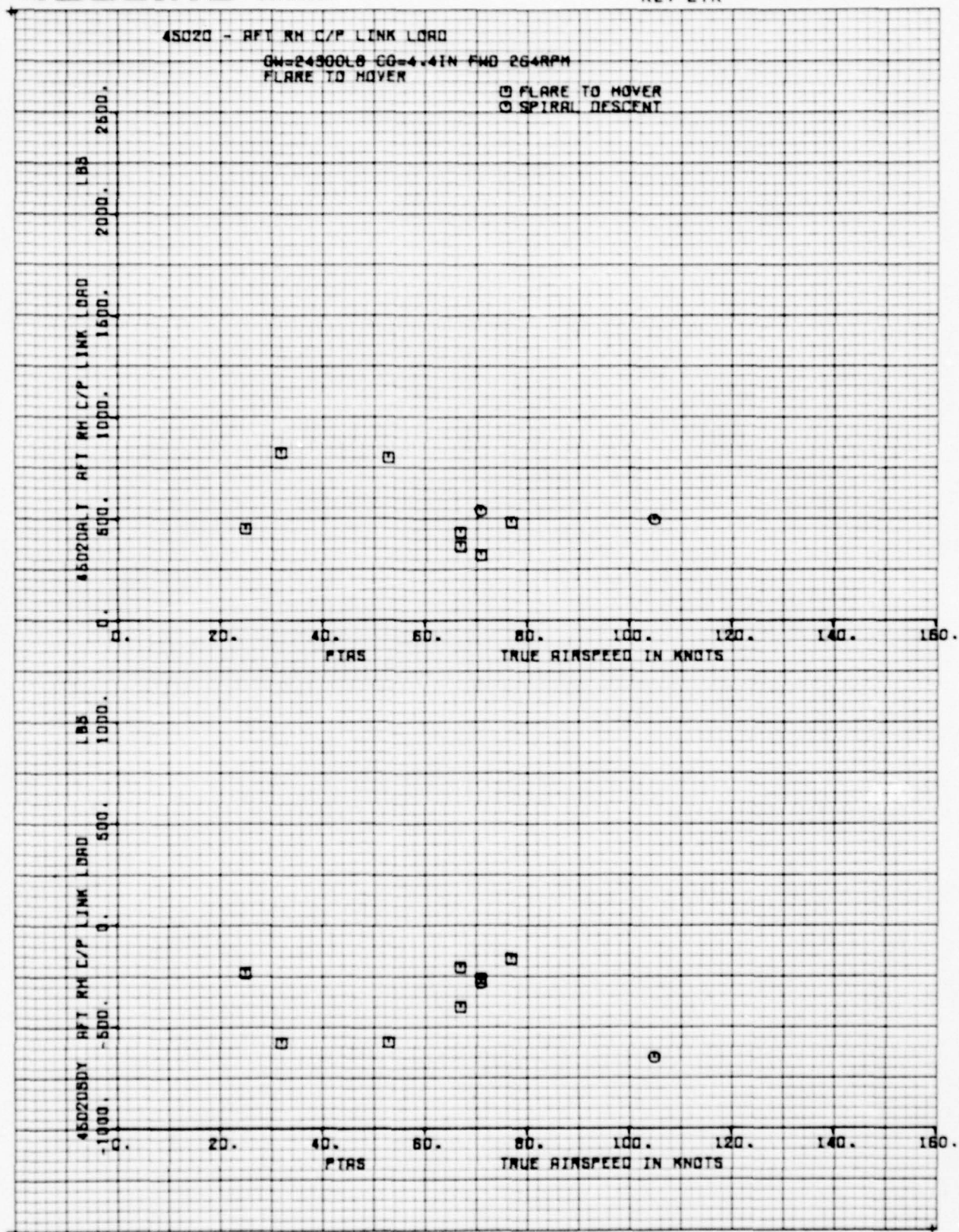
45020 - RPT RH C/P LINK LOAD

GM=24300LB CO=4.4IN FWD

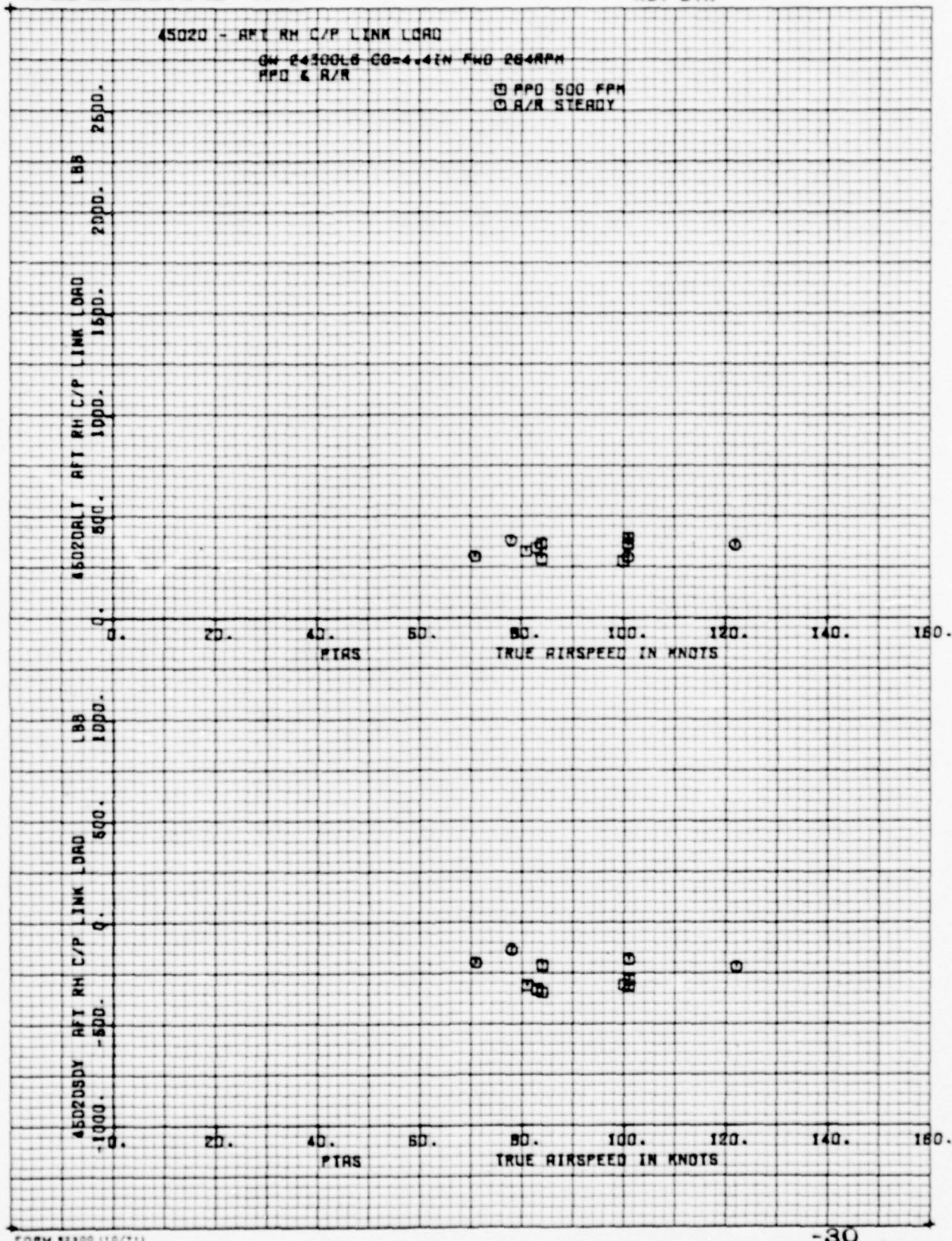
POWER ON CONTROL REVERSALS

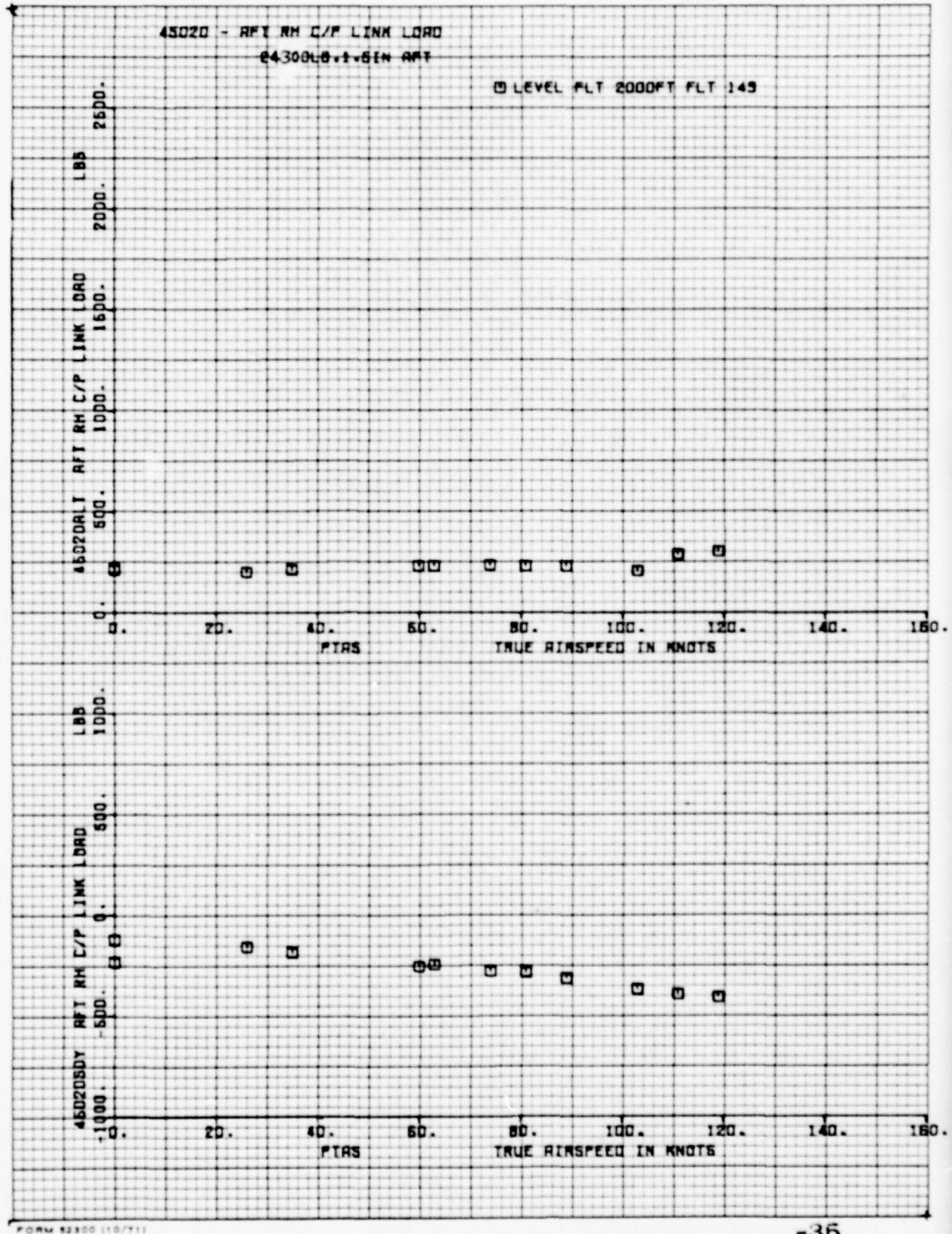
- LAT CONT REV 2000FT
- LONG CONT REV 2000FT
- ▲ DIR CONT REV 2000FT
- + LAT CONT REV >6000FT
- × LONG CONT REV >6000FT
- ◇ DIR CONT REV >6000FT





FORM 52300 (10/71)





FORM 12300 (10/71)

THE **BOEING** COMPANY

PREPARED BY: J. Bendo

CHECKED BY:

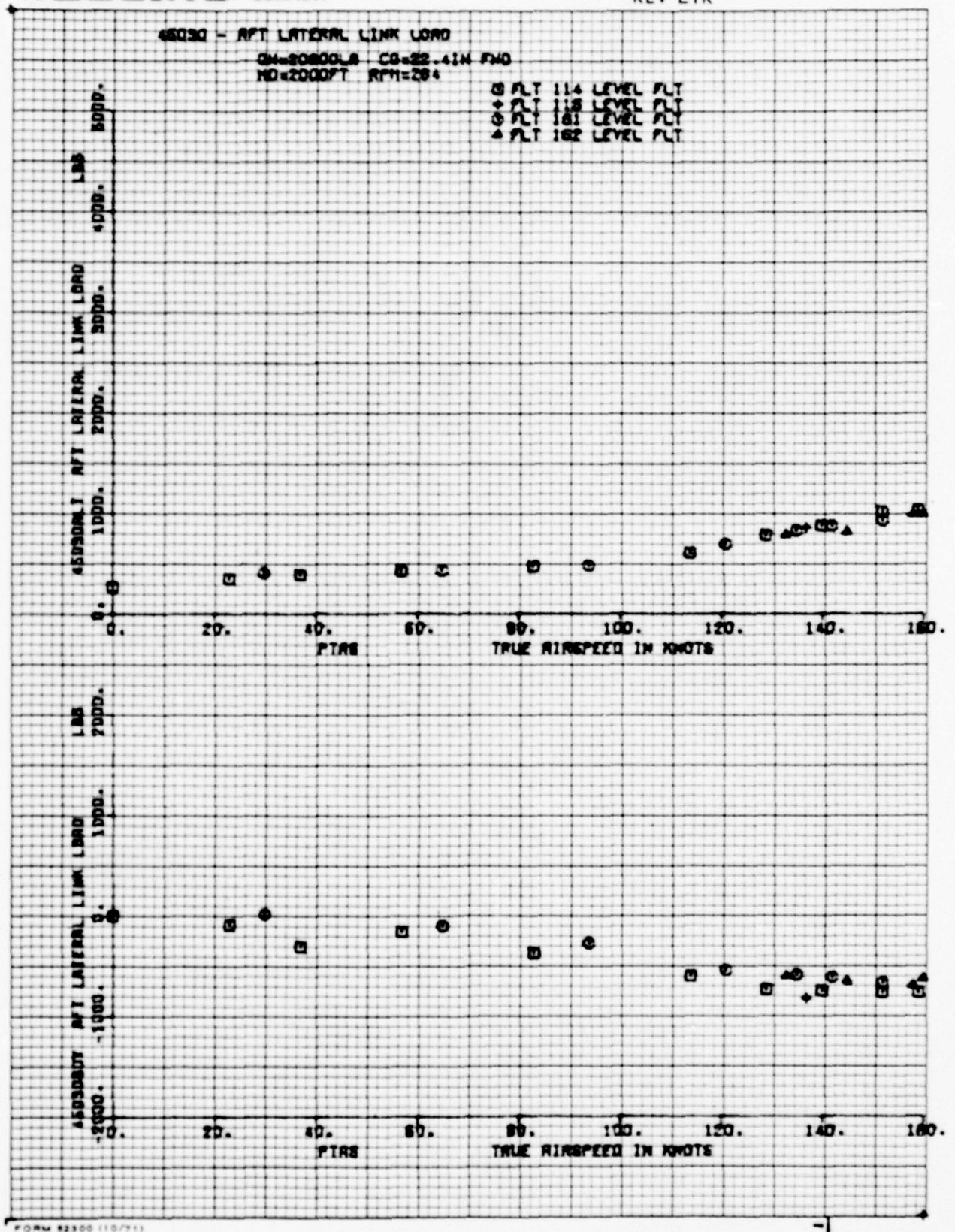
DATE: 8/28/78

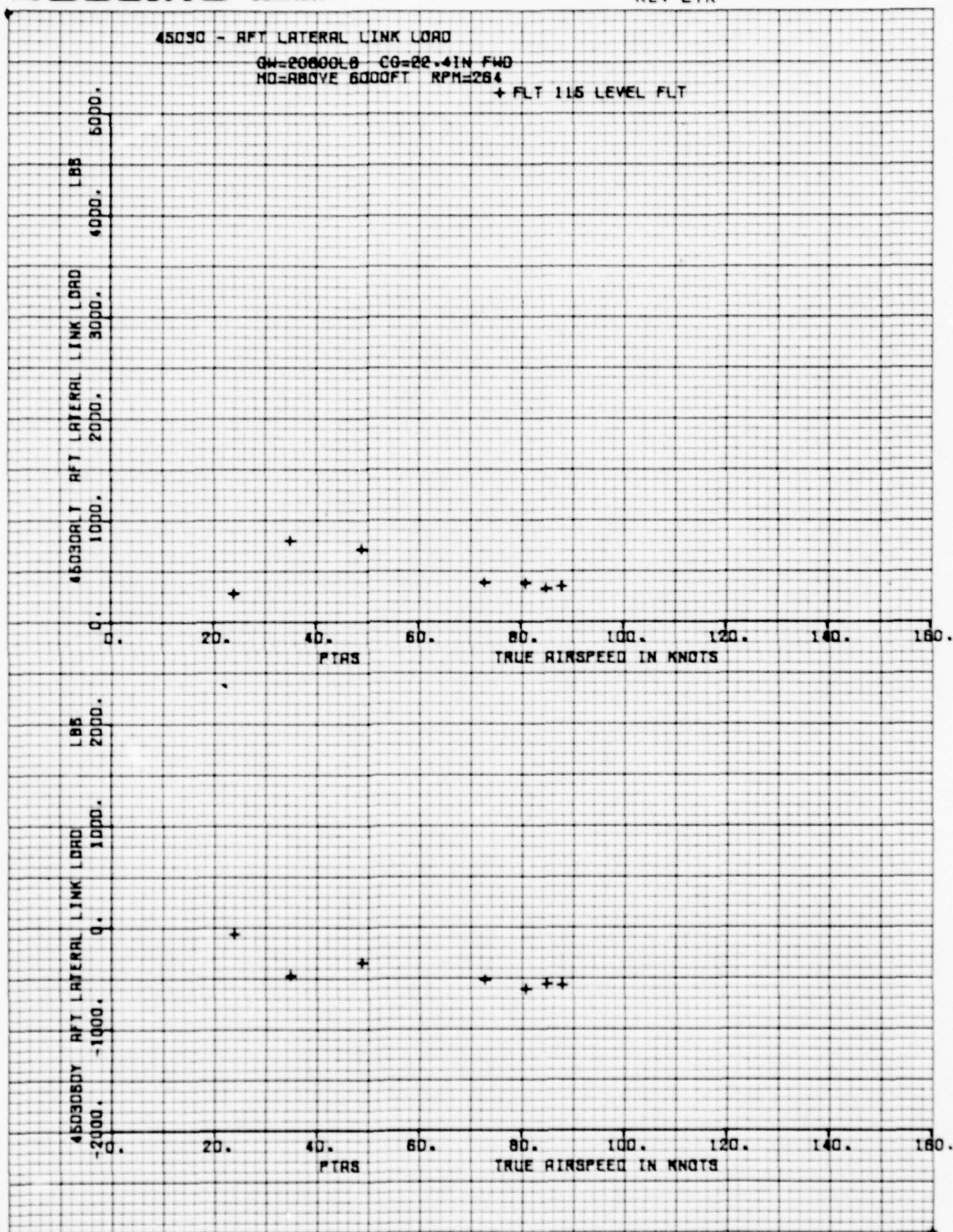
NUMBER D210-11168-3

REV LTR Volume 7

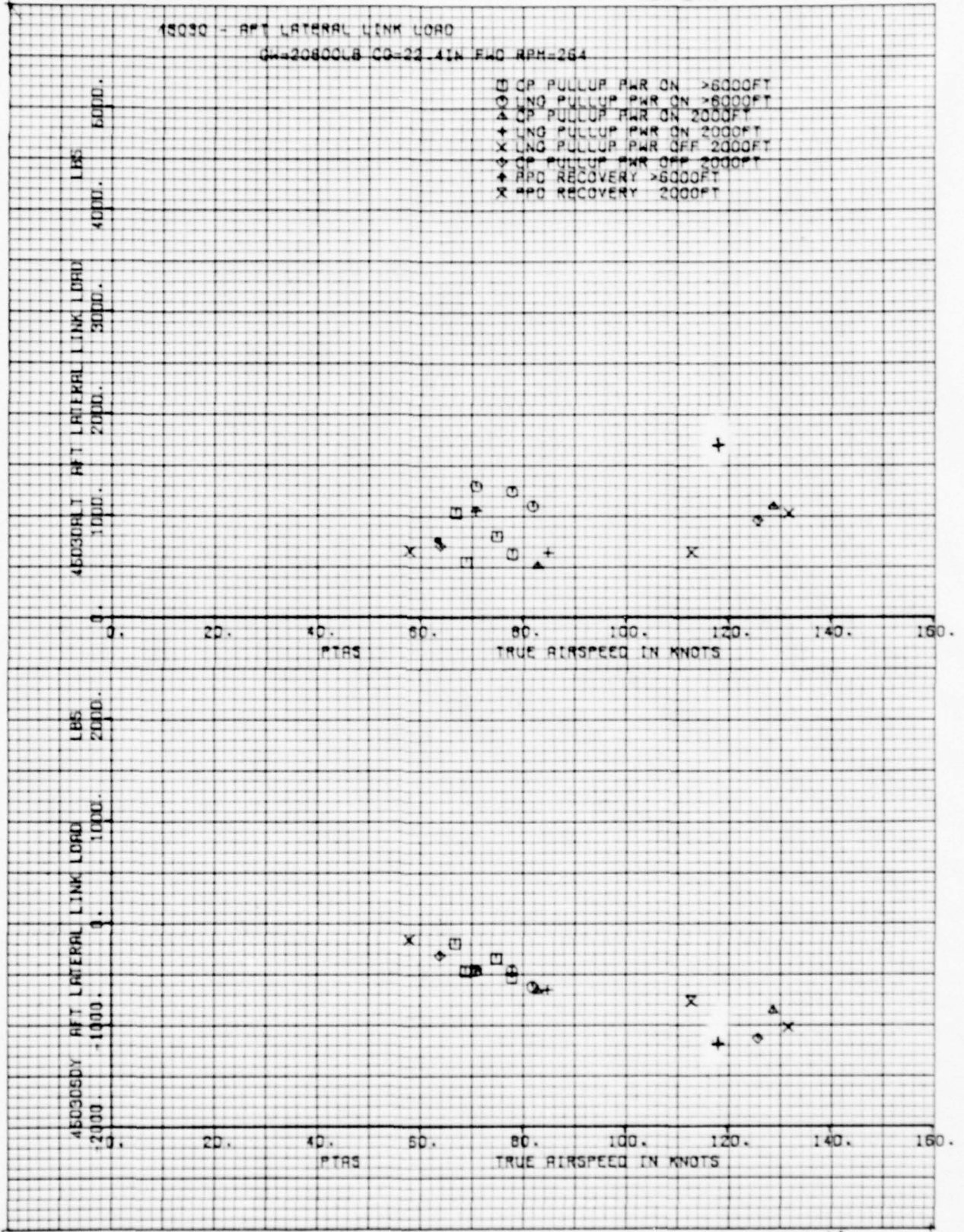
MODEL NO.

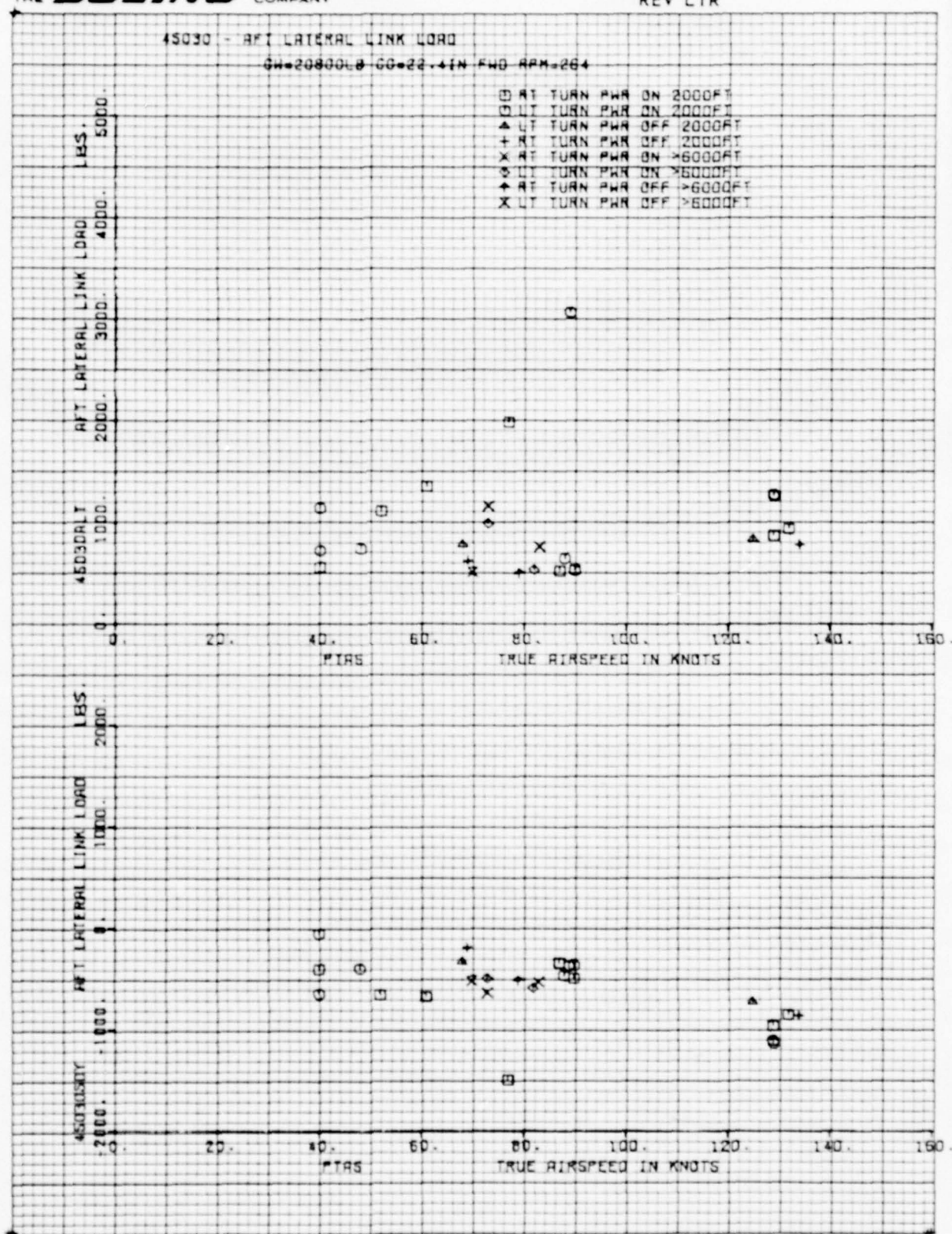
4.8 Aft Lateral Link

THE **BOEING** COMPANY

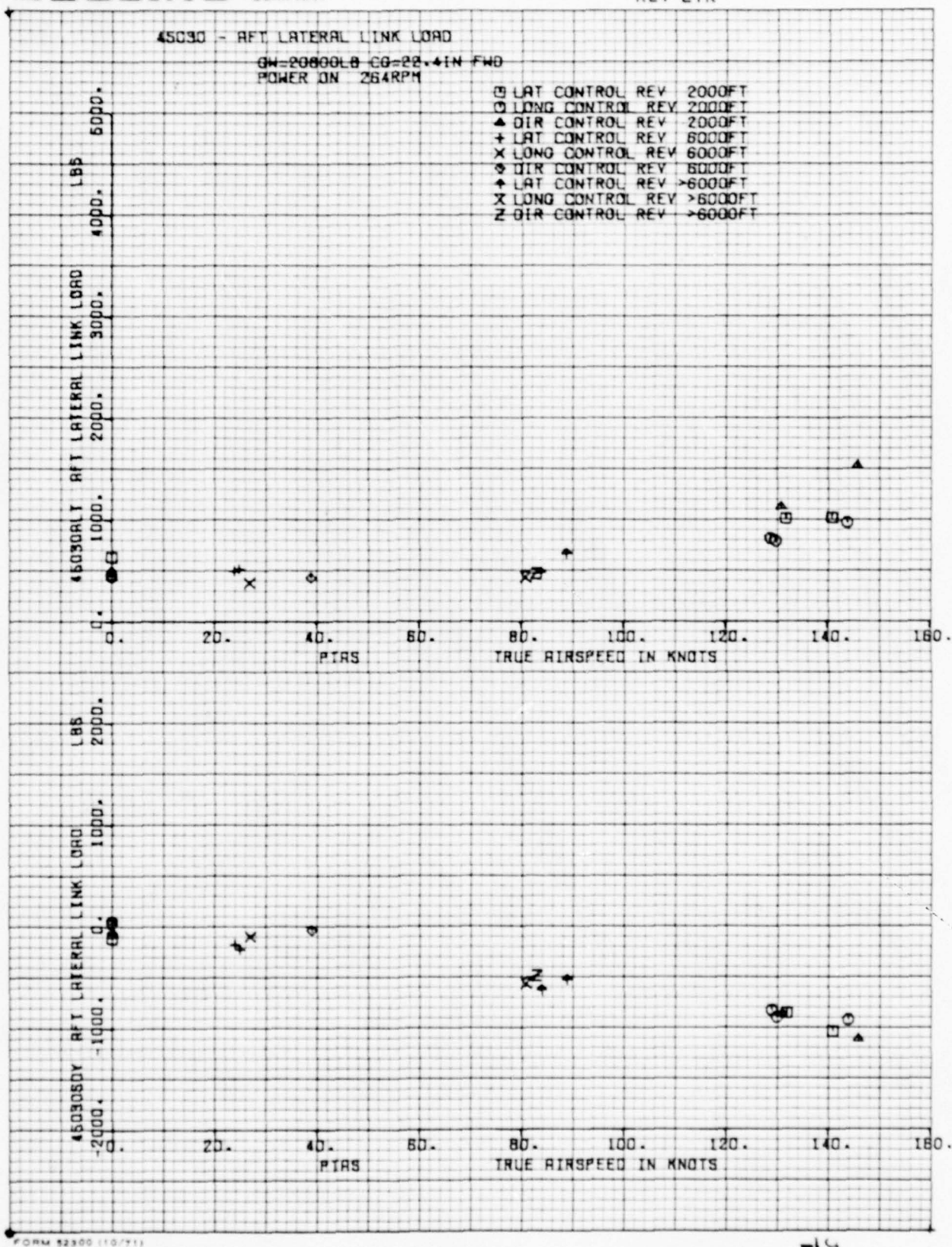
THE **BOEING** COMPANY

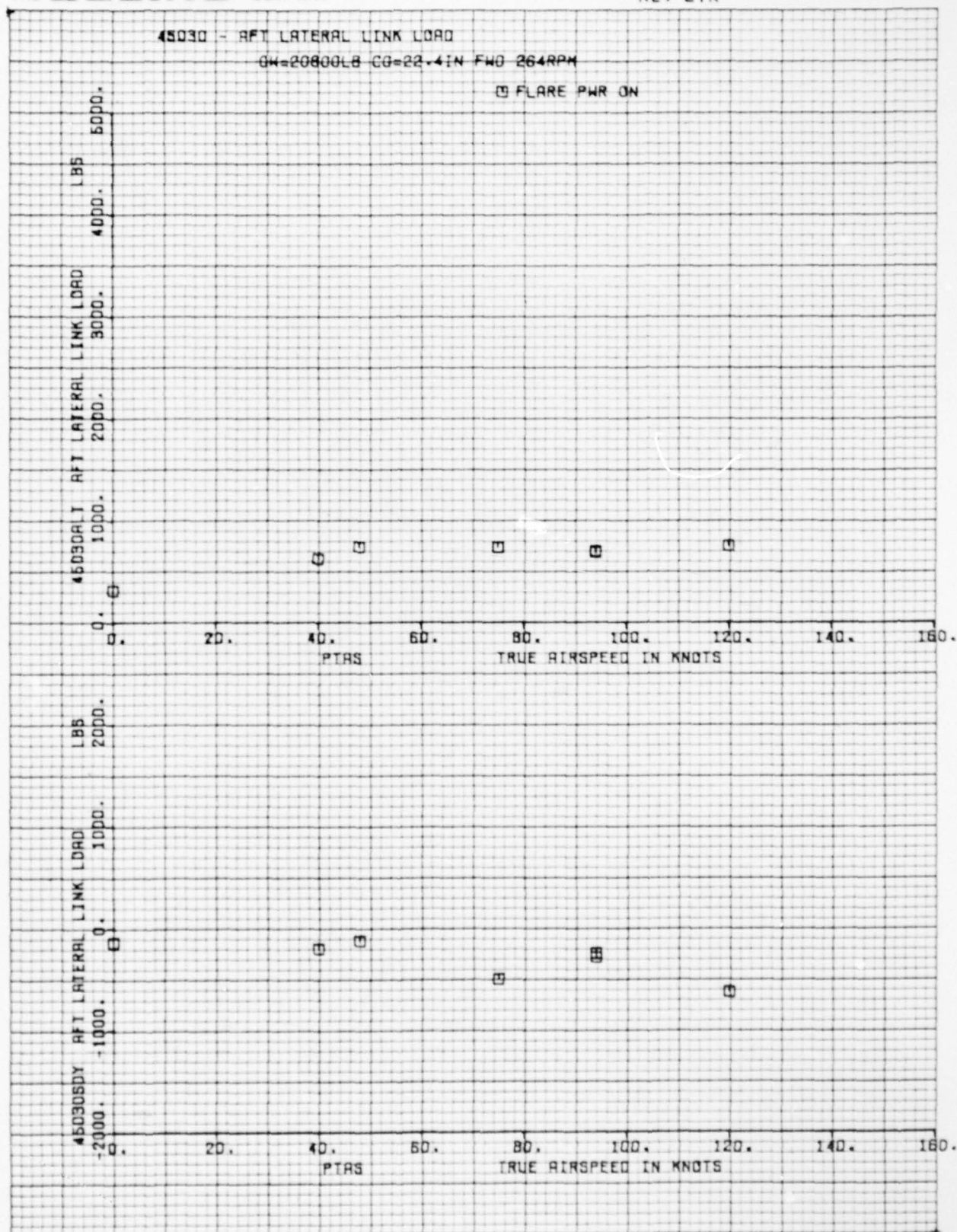
FORM 52300 (10/71)



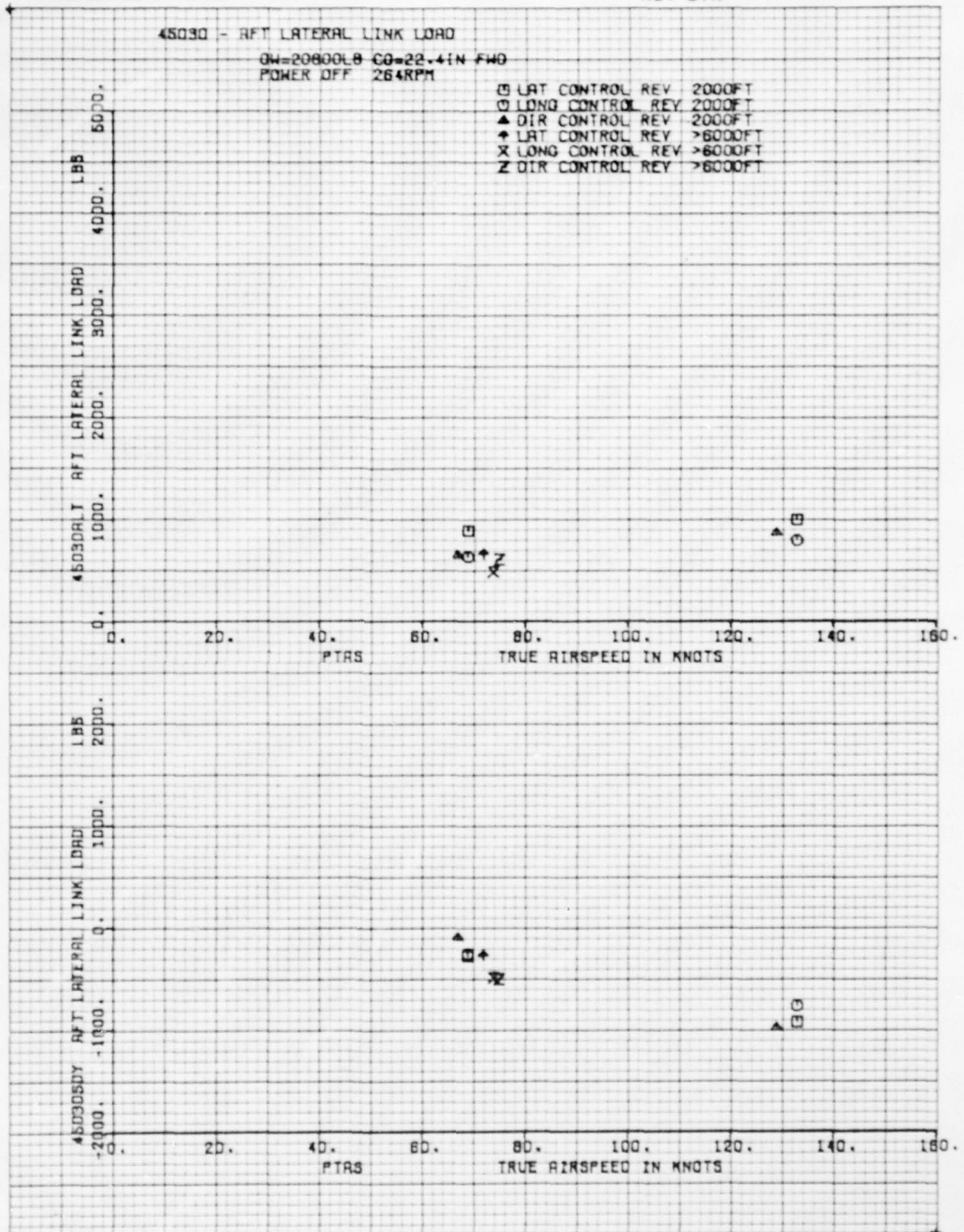
THE **BOEING** COMPANY

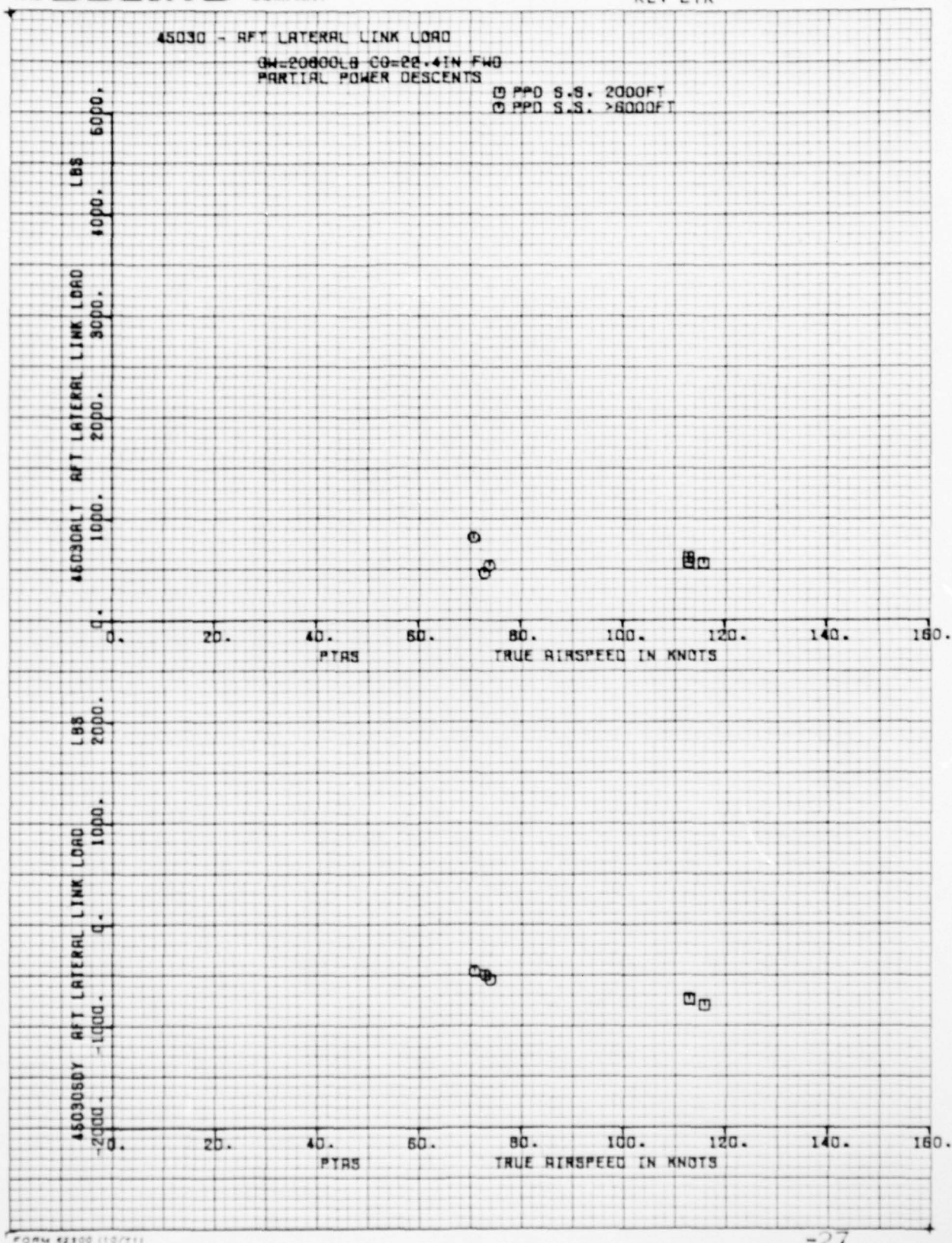
FORM 52300 (10/71)

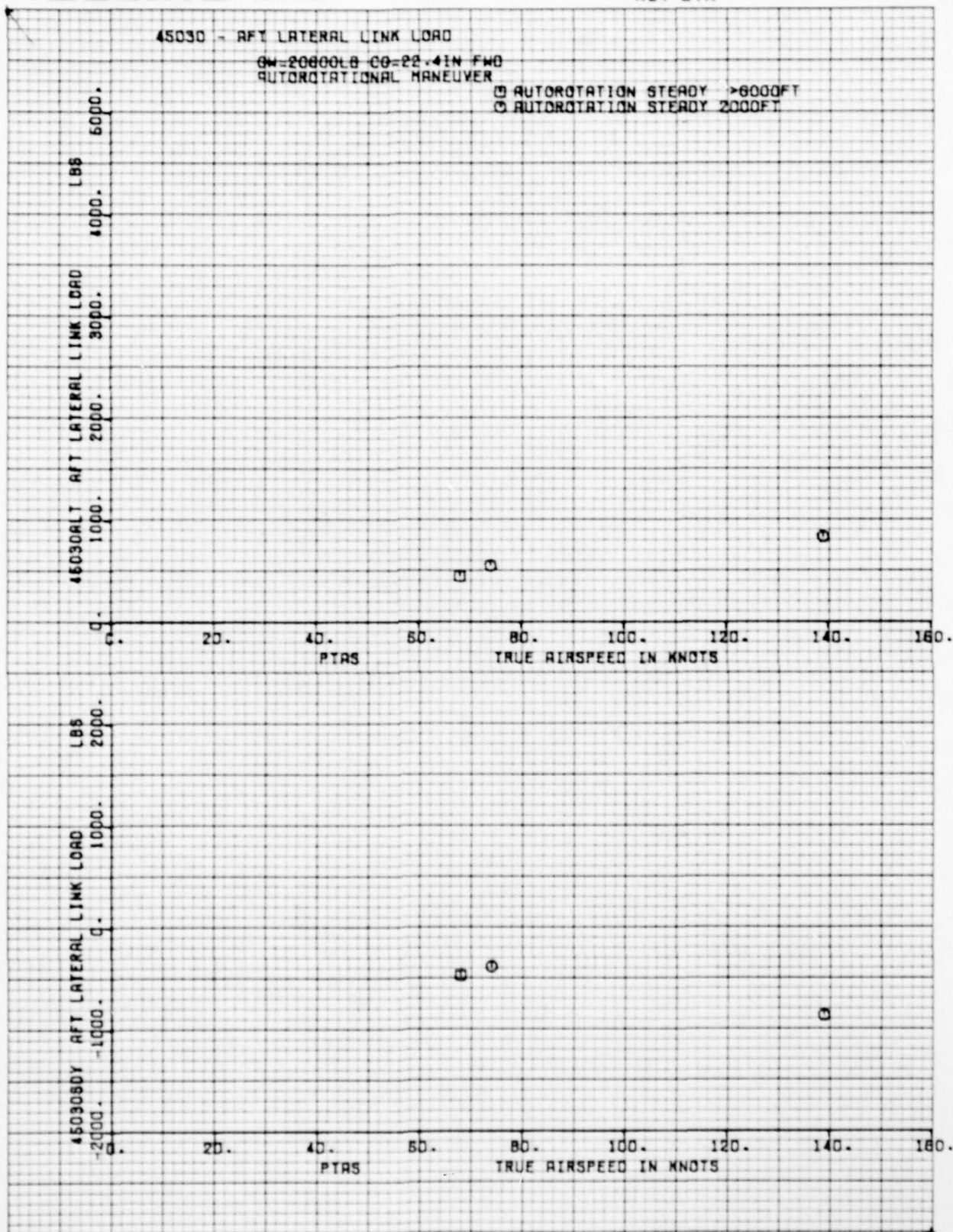


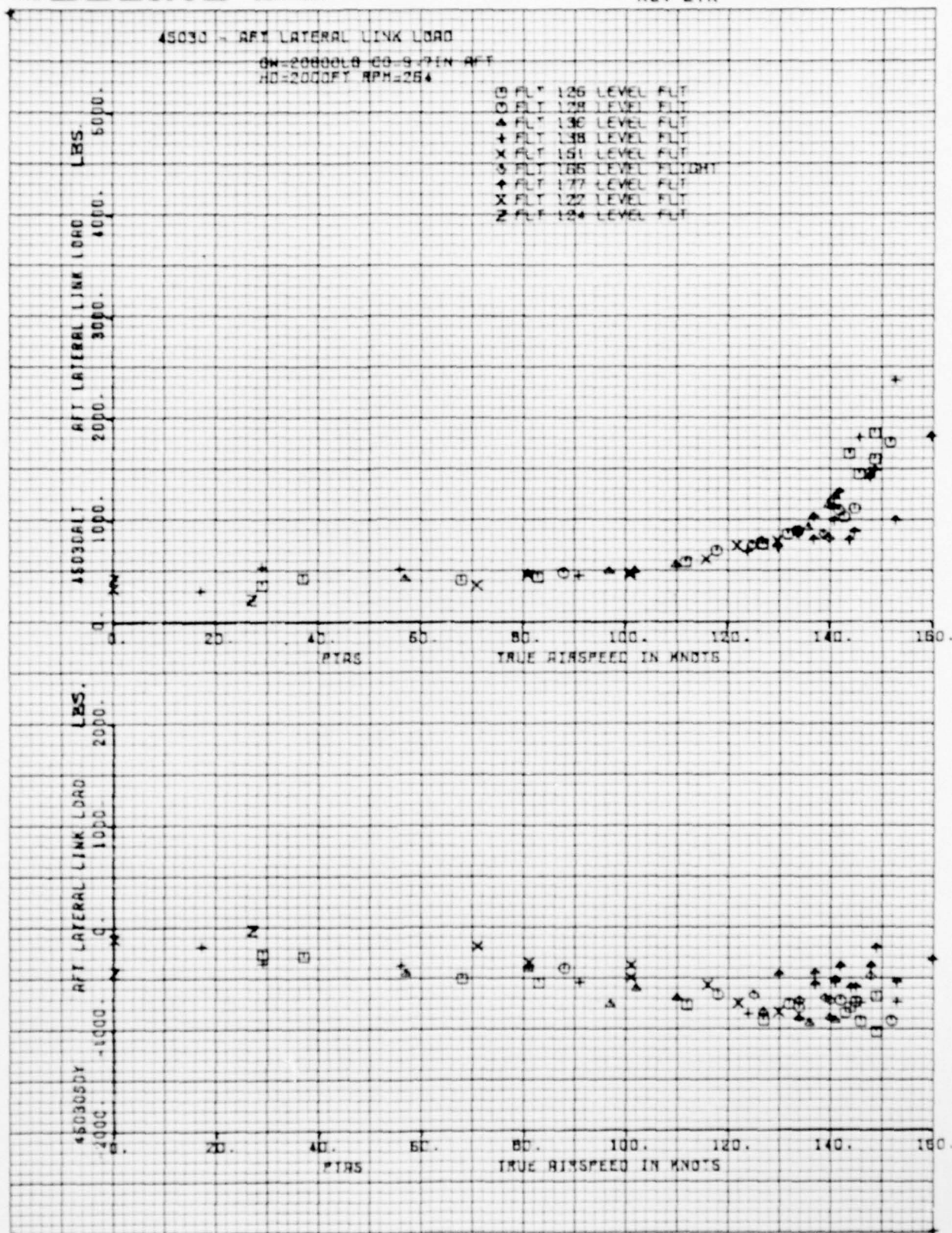
THE **BOEING** COMPANY

FORM 52300 (10/71)

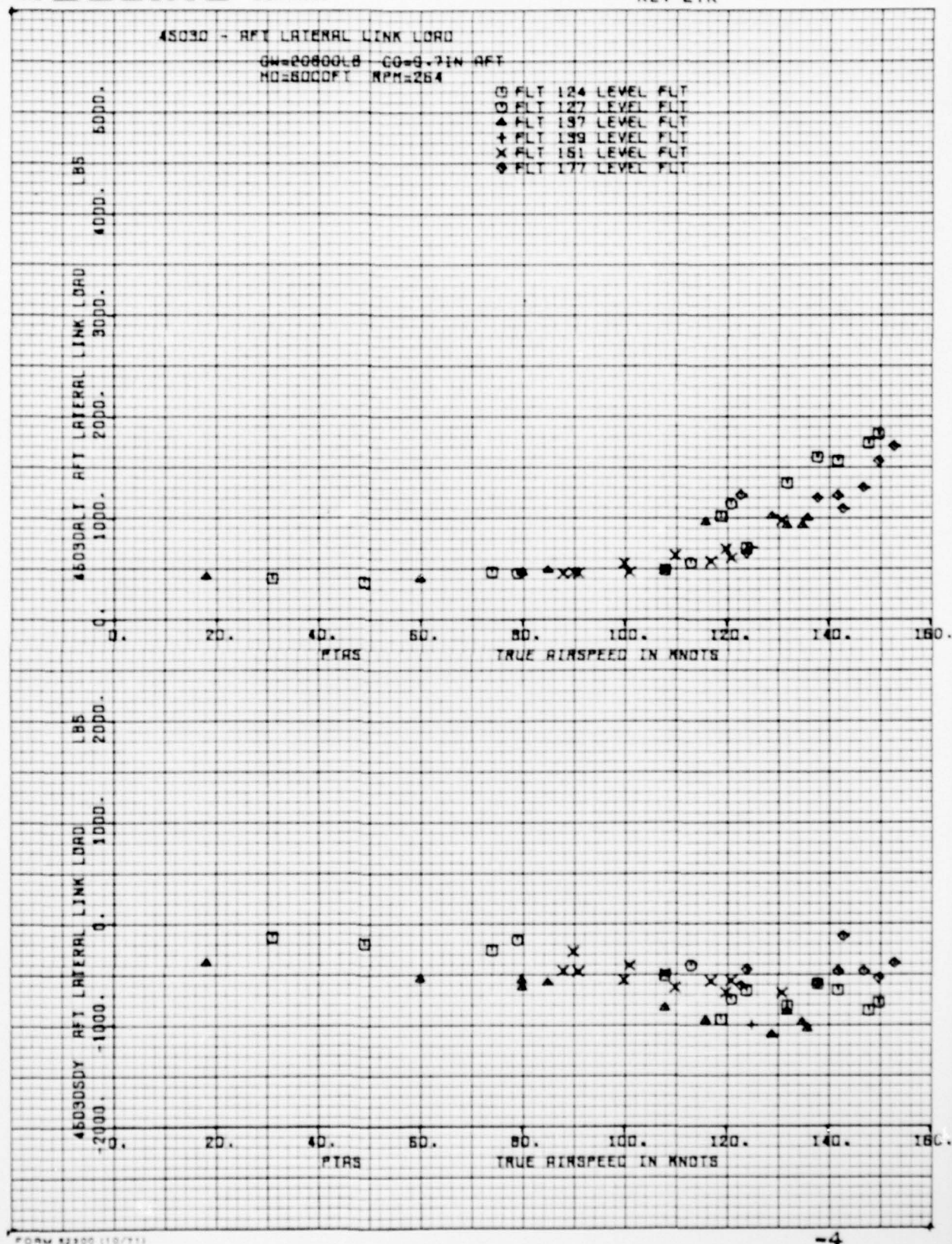




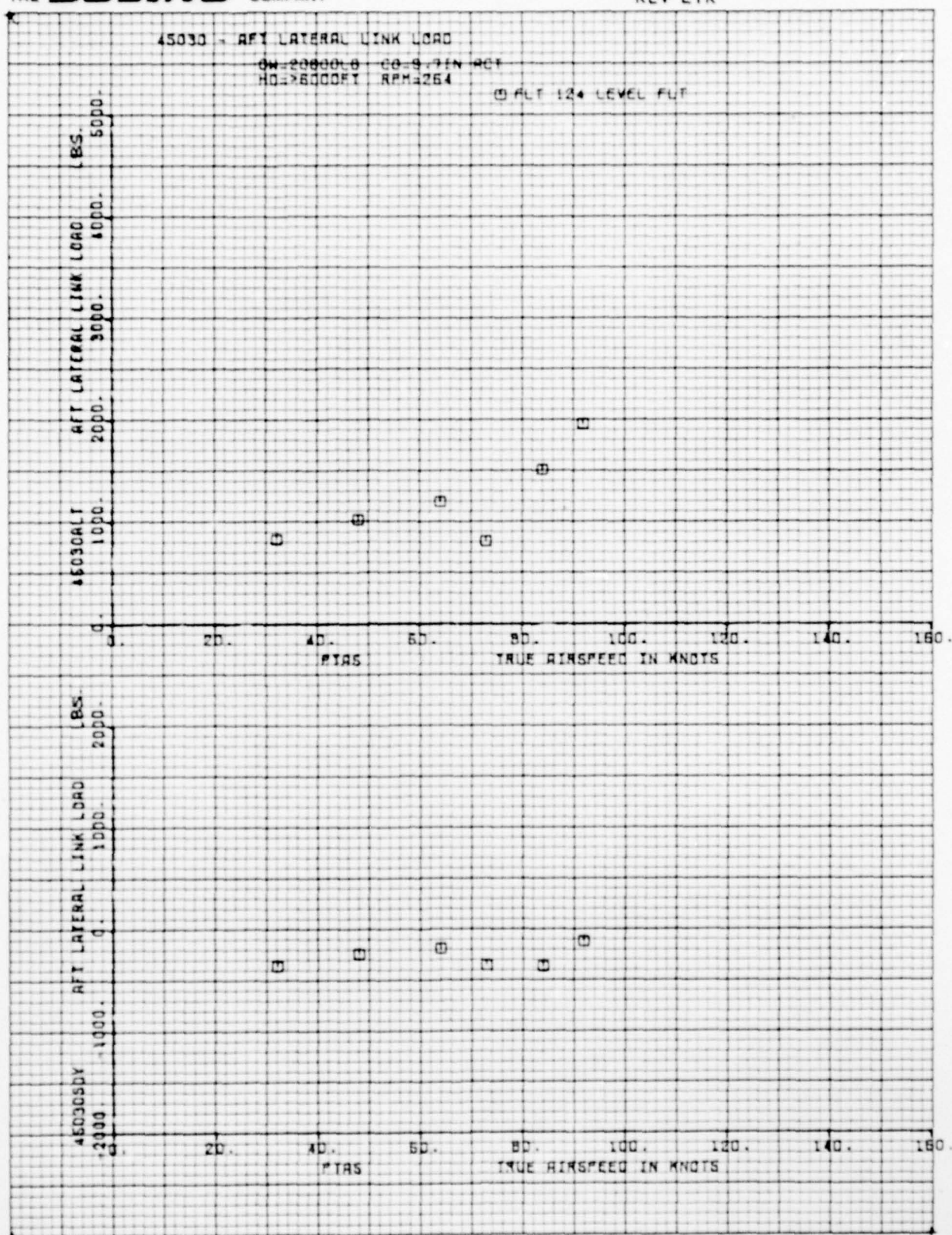




FORM 52300 (10/71)

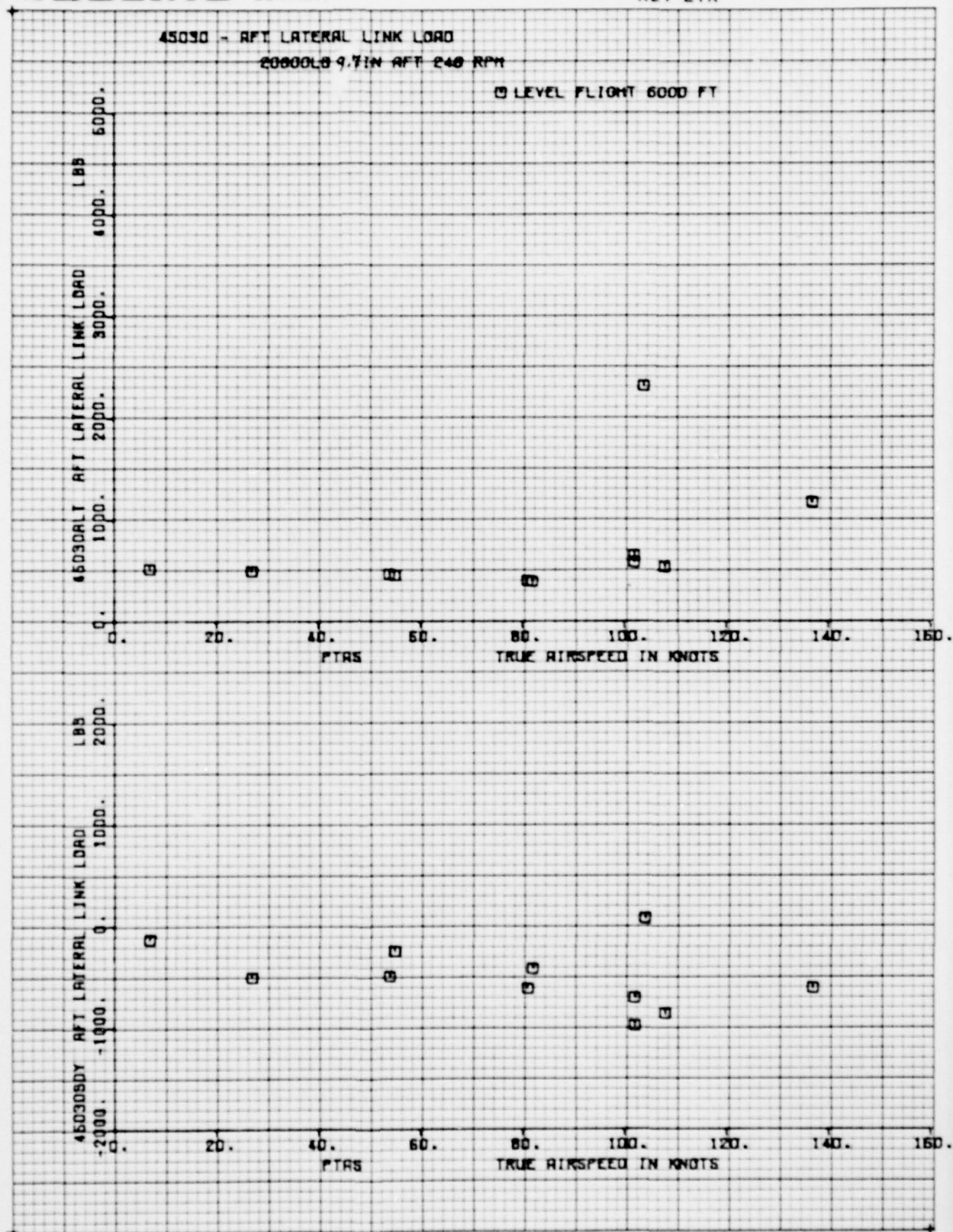


FORM 82300 (10/71)

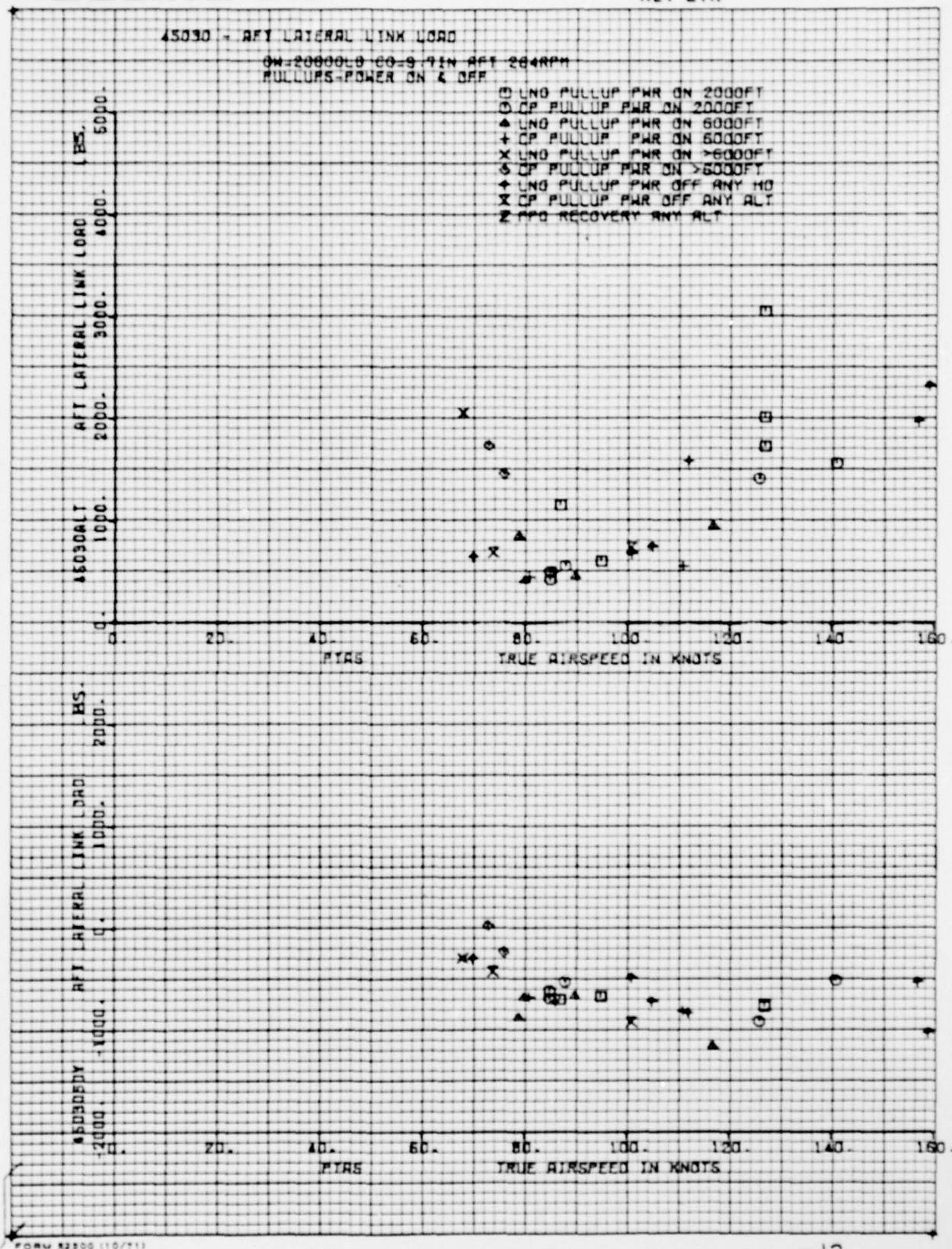
THE **BOEING** COMPANY

FORM 52300 (10/71)

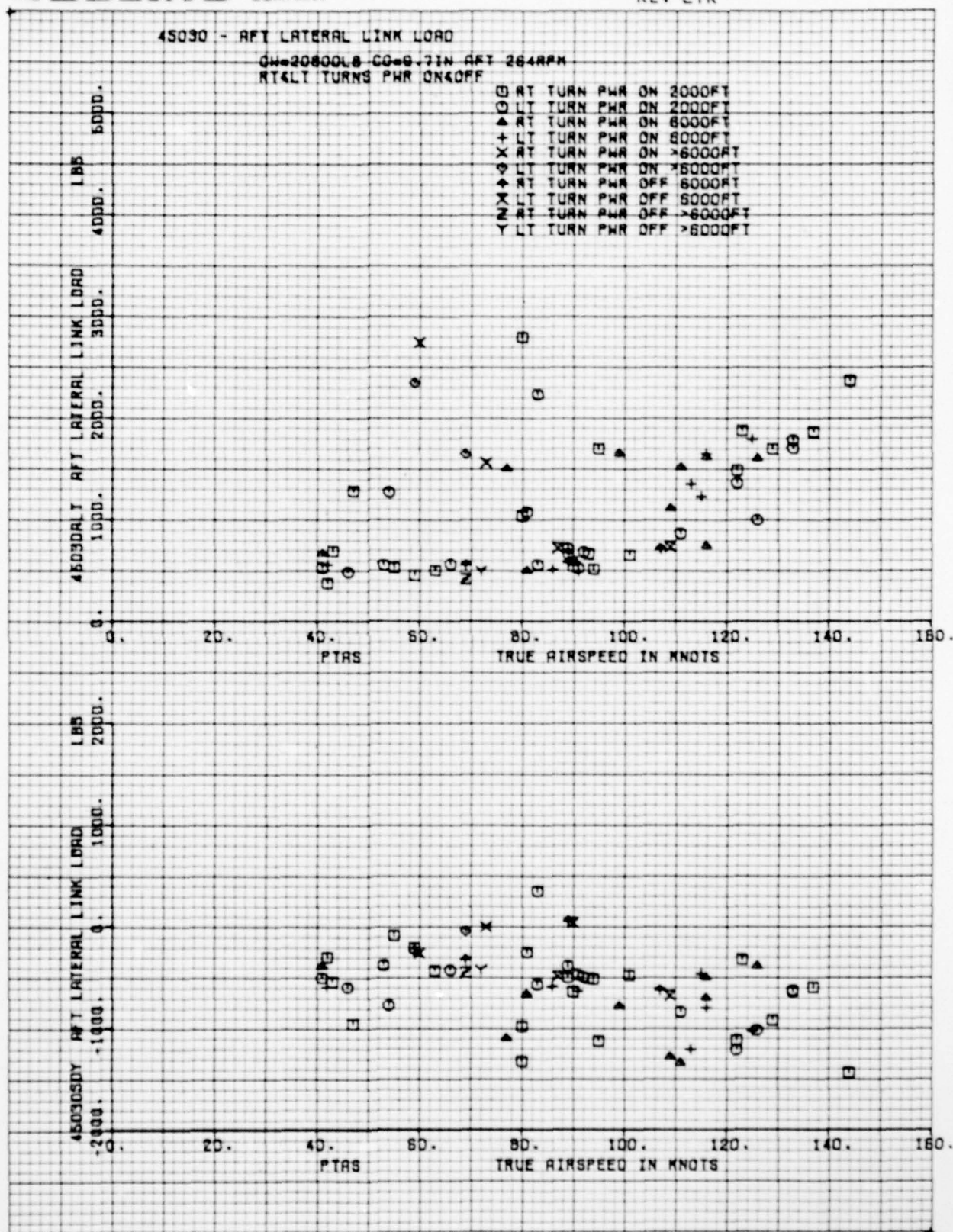
THE **BOEING** COMPANY

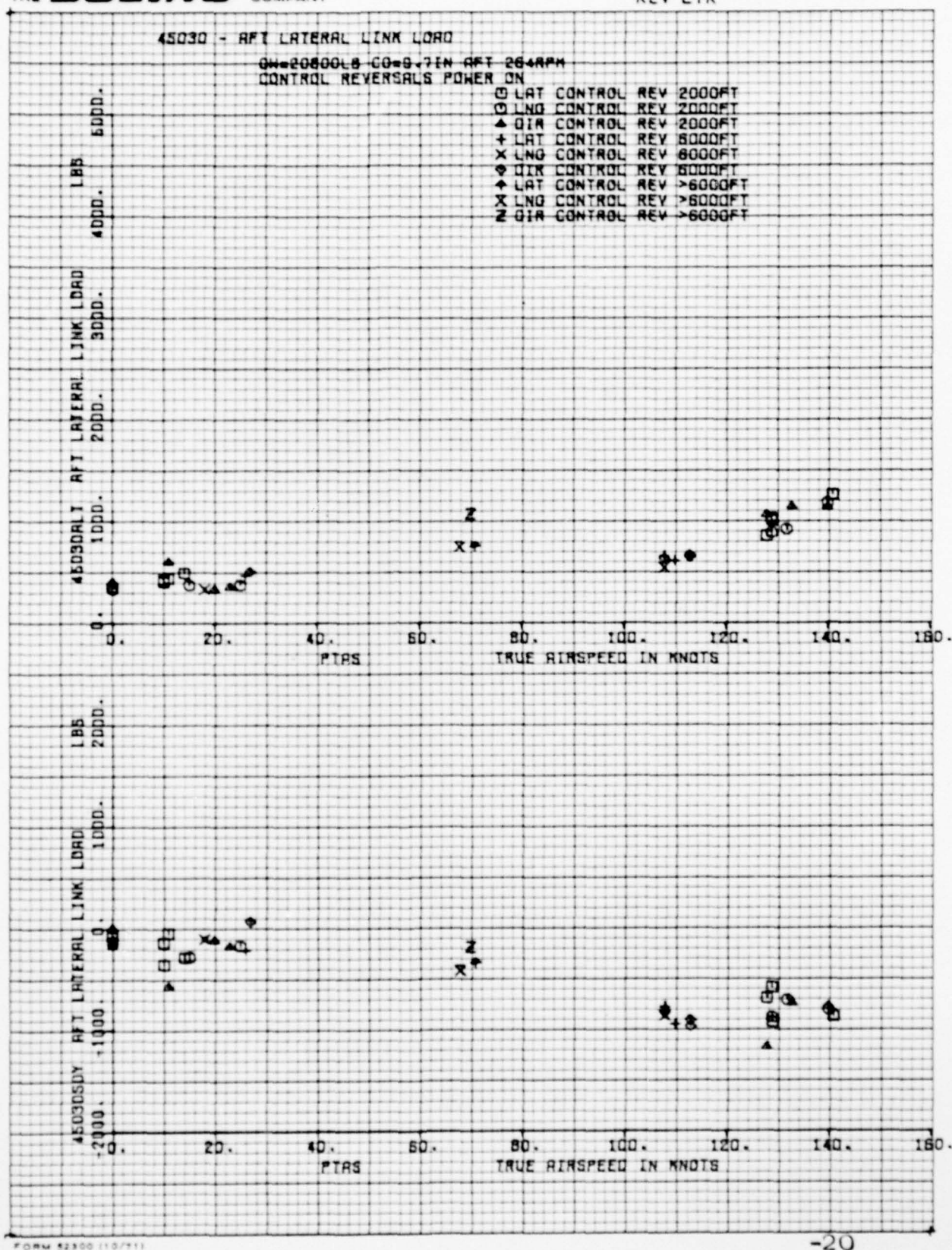


FORM 52300 (10/71)

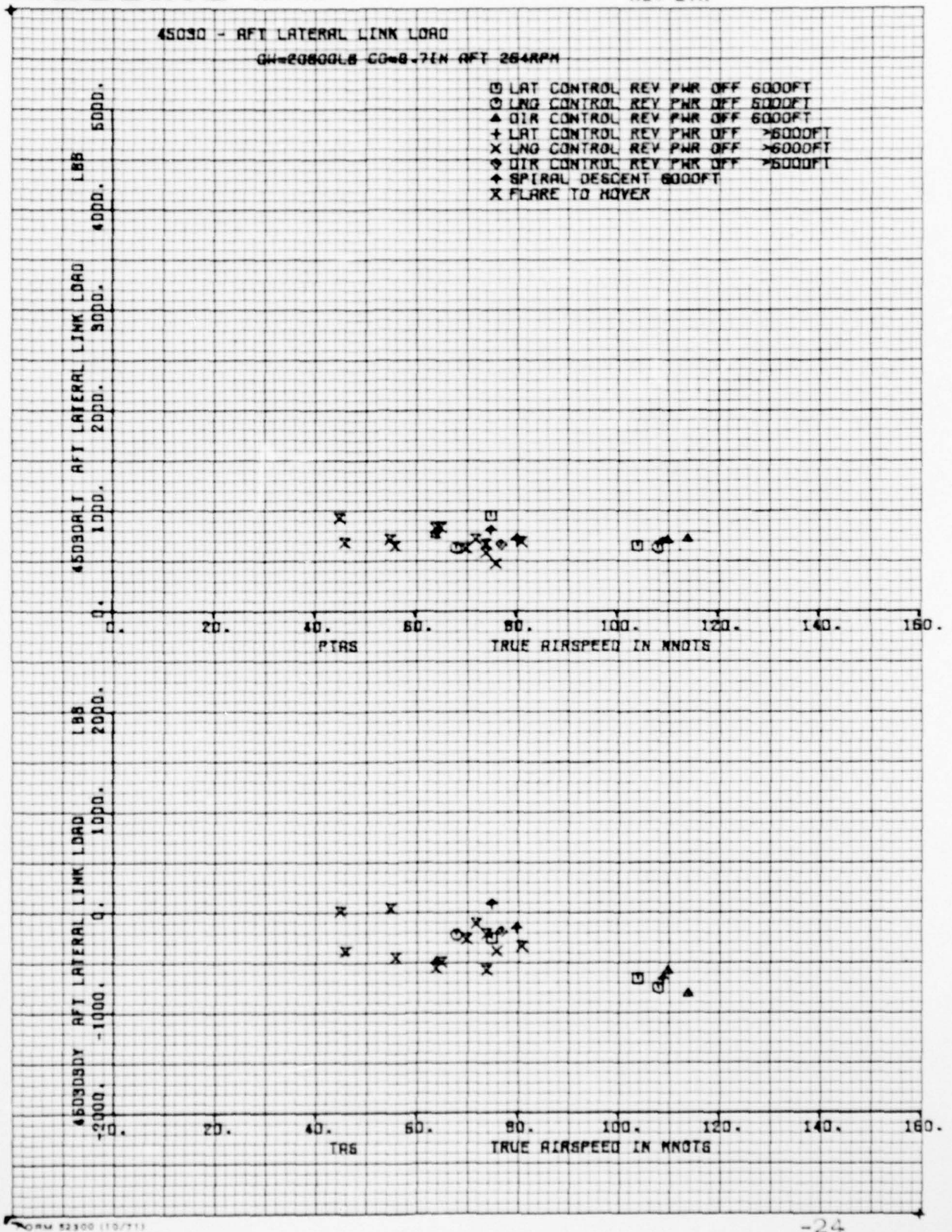


FORM 82300 (10/71)

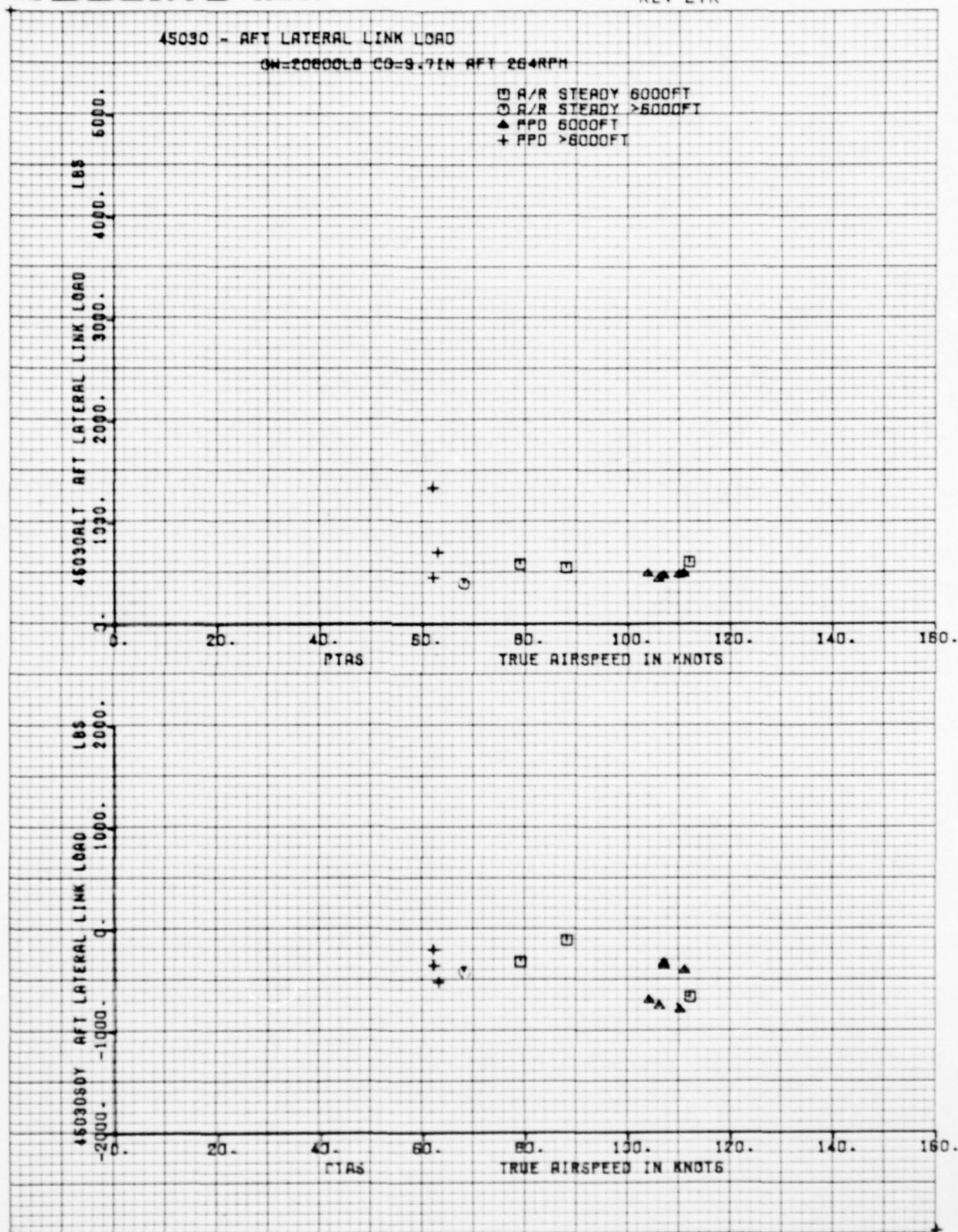


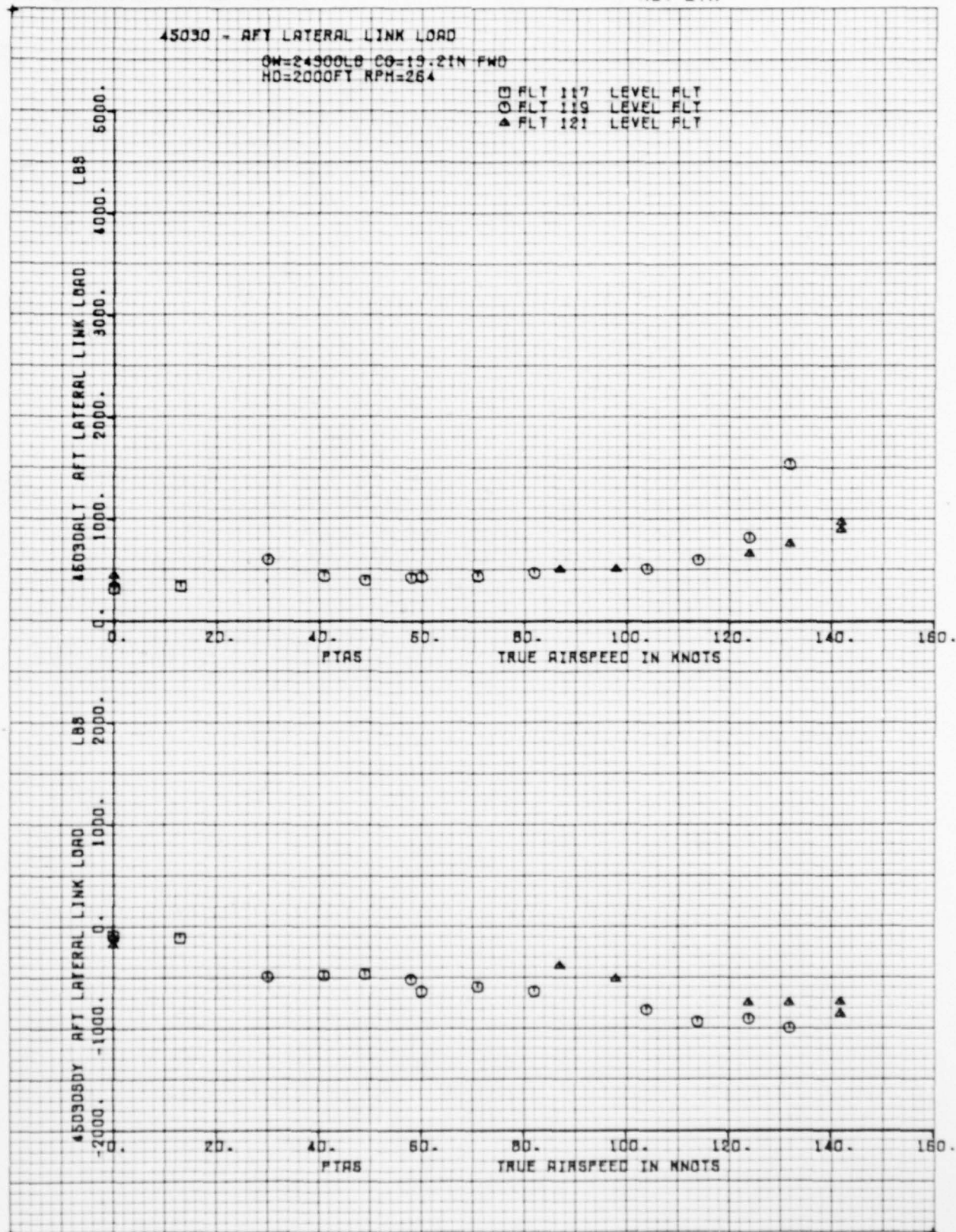
THE **BOEING** COMPANY

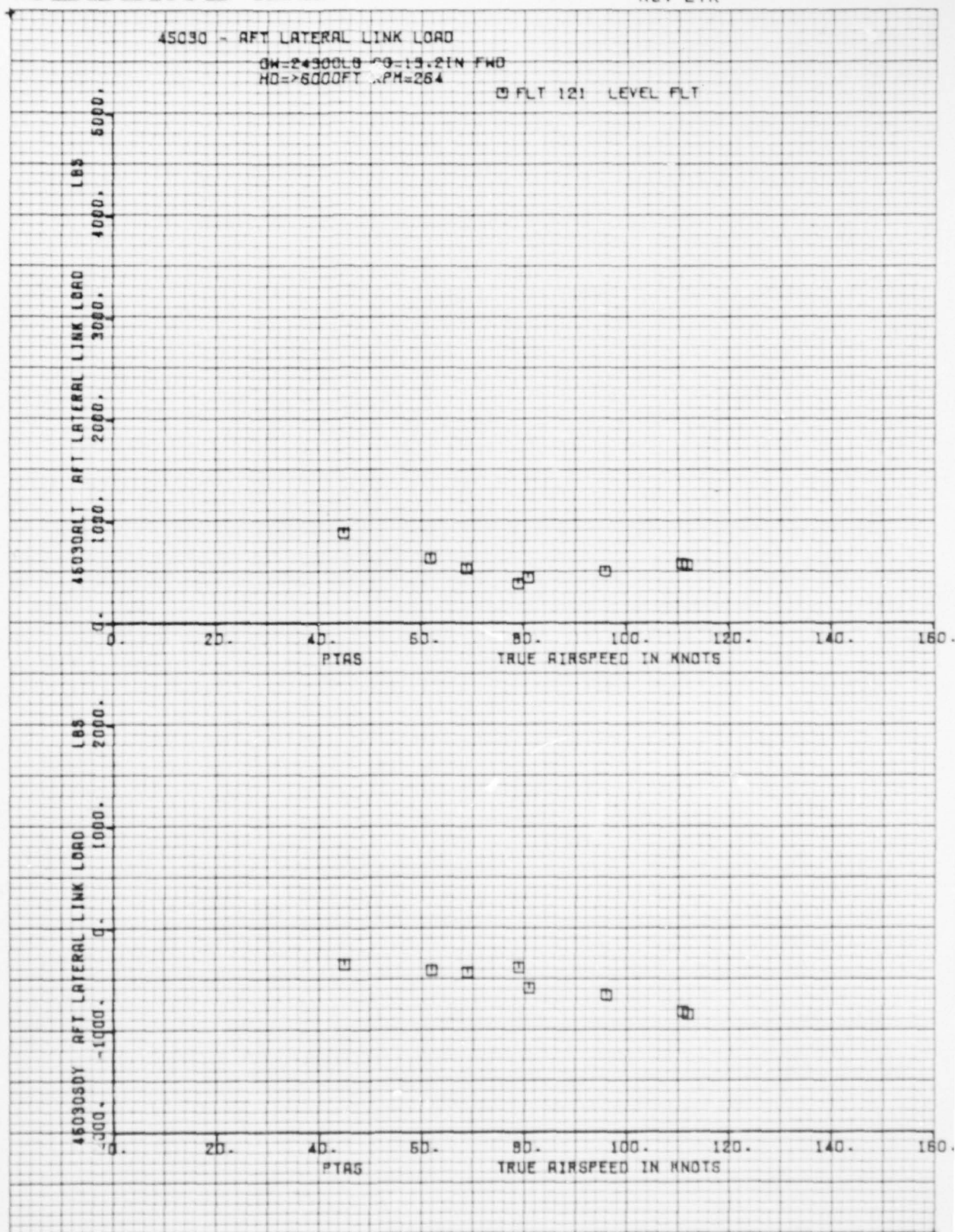
FORM 52300 (10/71)



FORM 52300 (10/71)





THE **BOEING** COMPANY

FORM 52300 (10/71)

AD-A075 616

BOEING VERTOL CO PHILADELPHIA PA

F/G 1/3

CH-46 COMPOSITE ROTOR BLADE FLIGHT STRESS SURVEY DATA. VOLUME V--ETC(U)

1978 R AIELLO, J BENDO

N00019-75-C-0396

UNCLASSIFIED

D210-11168-3-VOL-7

NL

4 OF 4

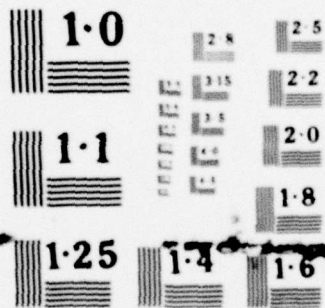
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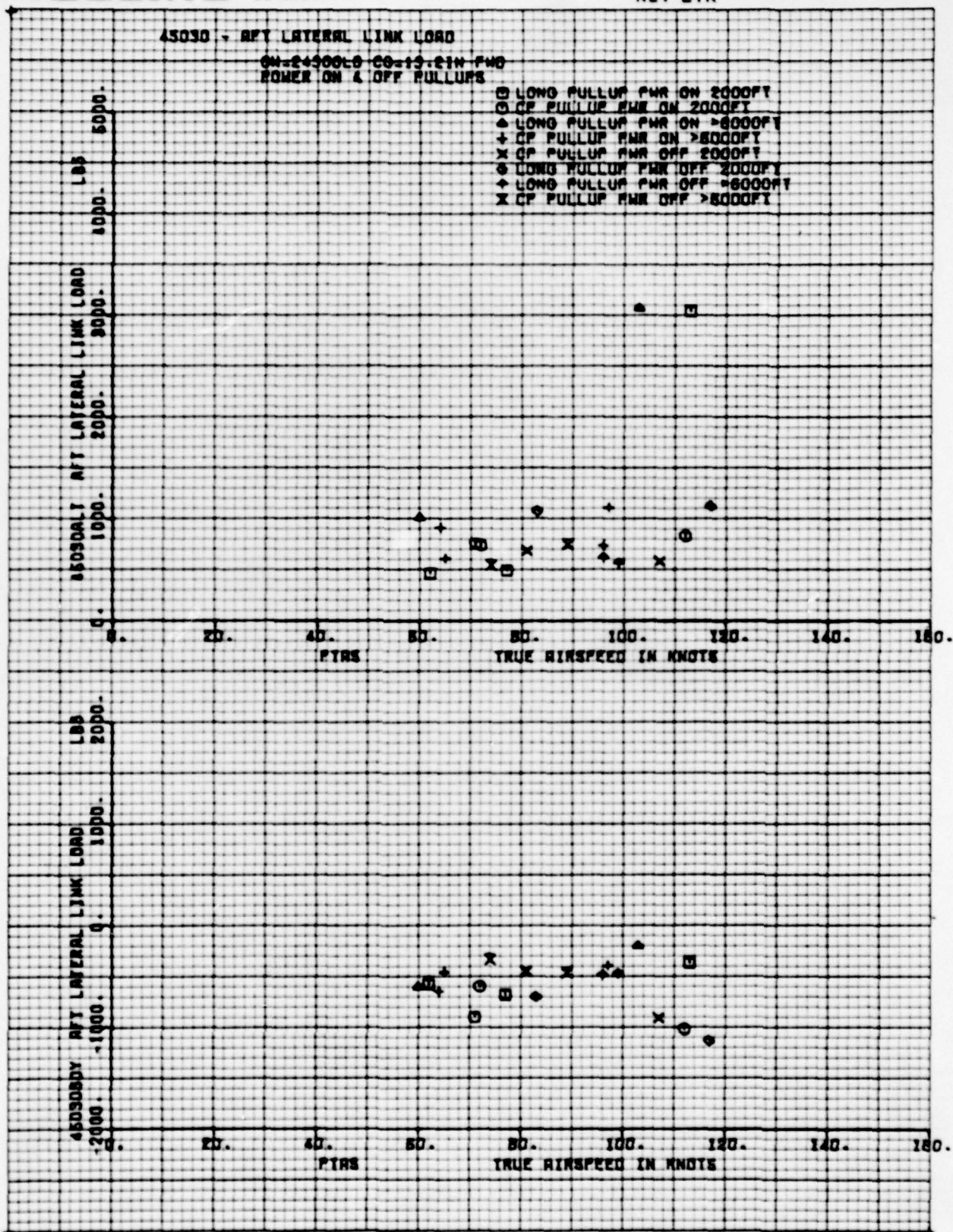
END
DATE
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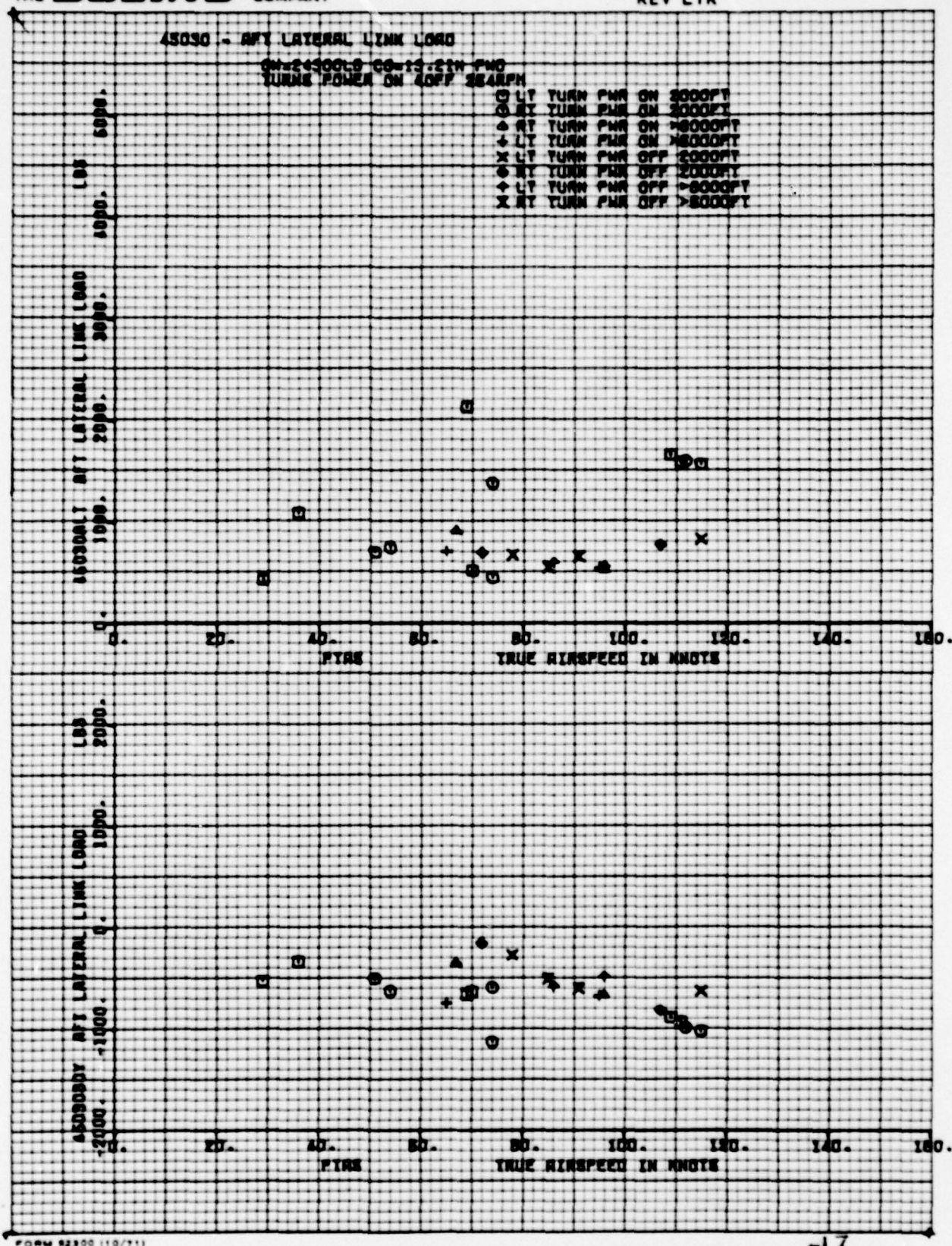
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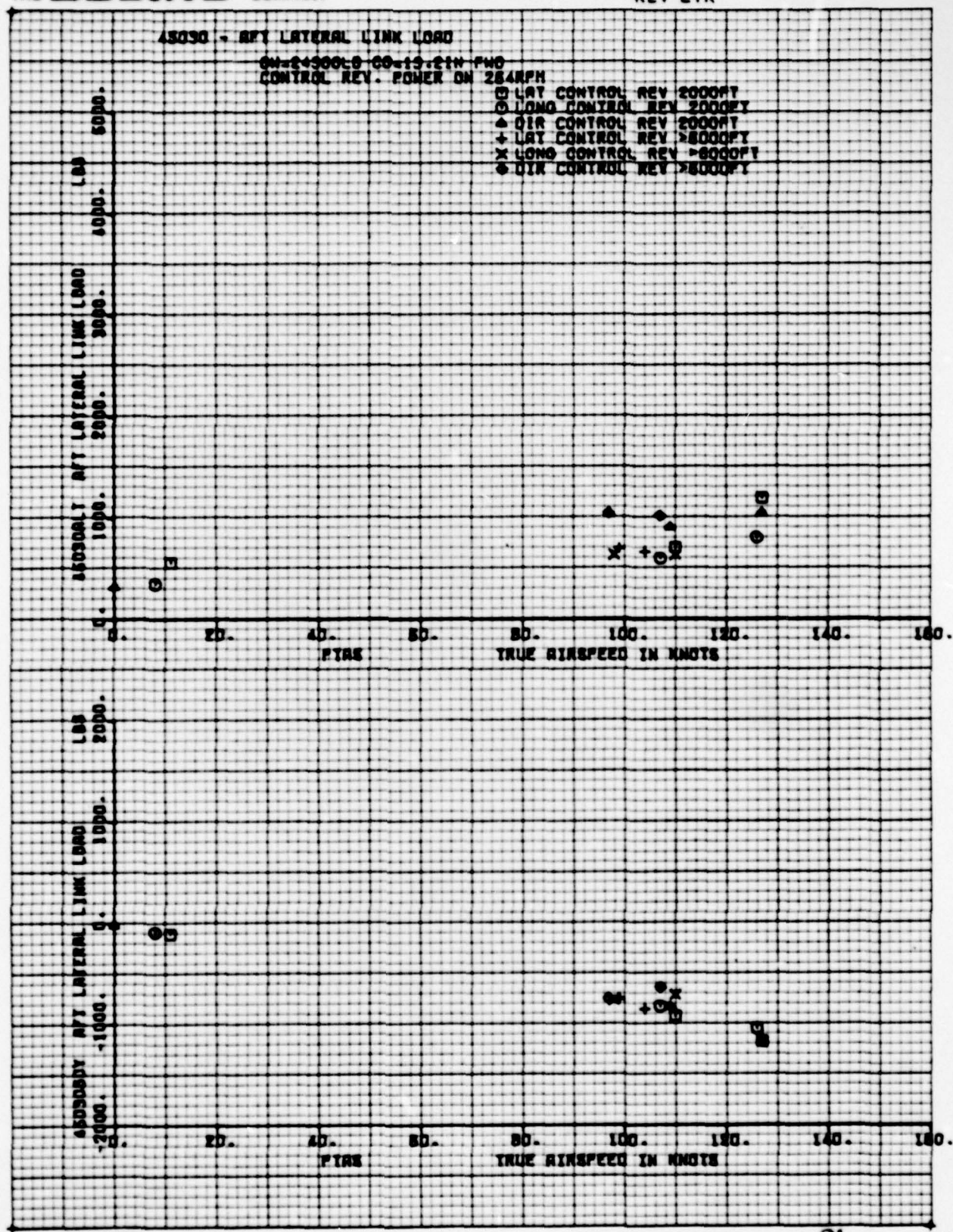
DDC



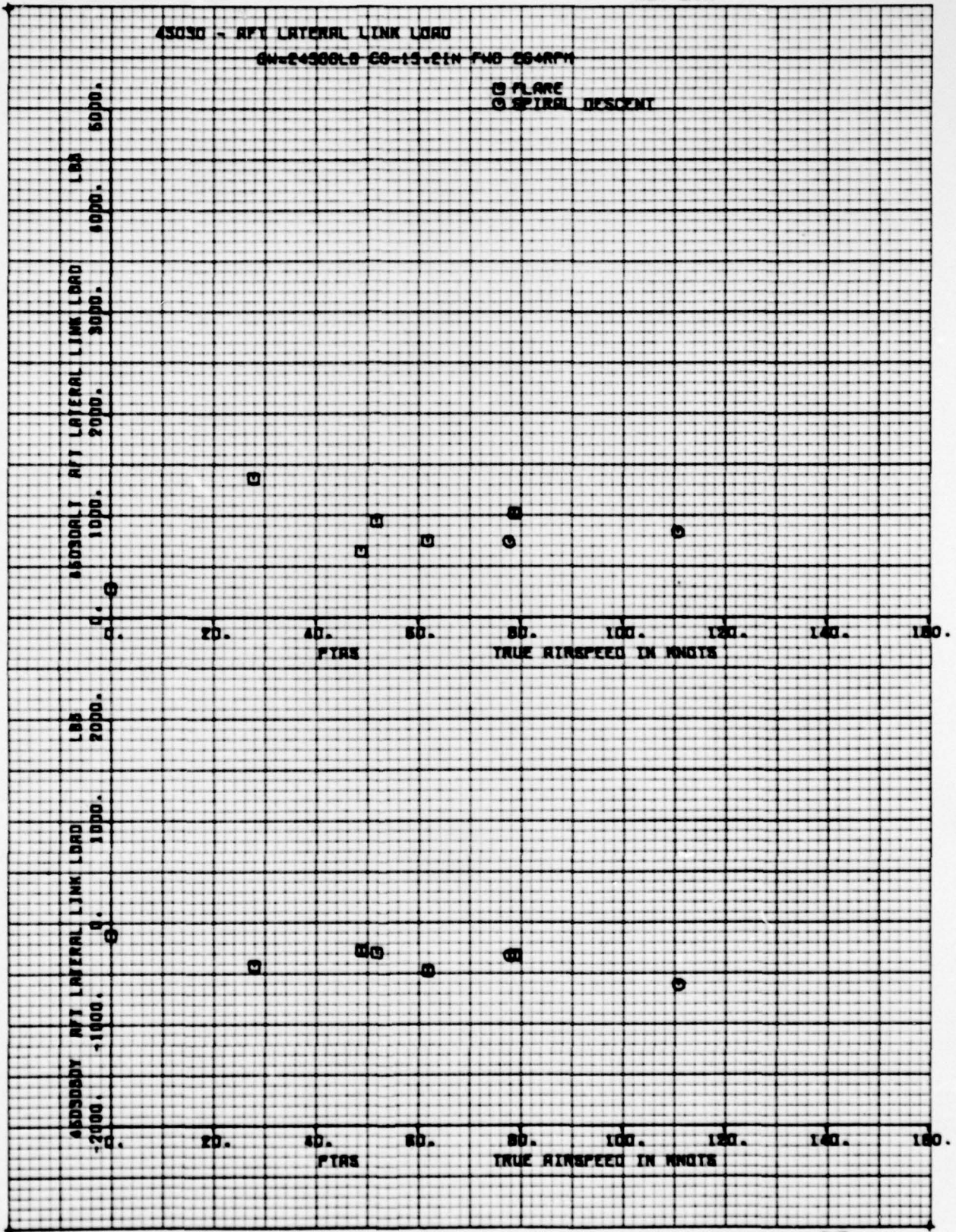
NATIONAL BUREAU OF STANDARDS
MICROCOPY RESOLUTION TEST CHART



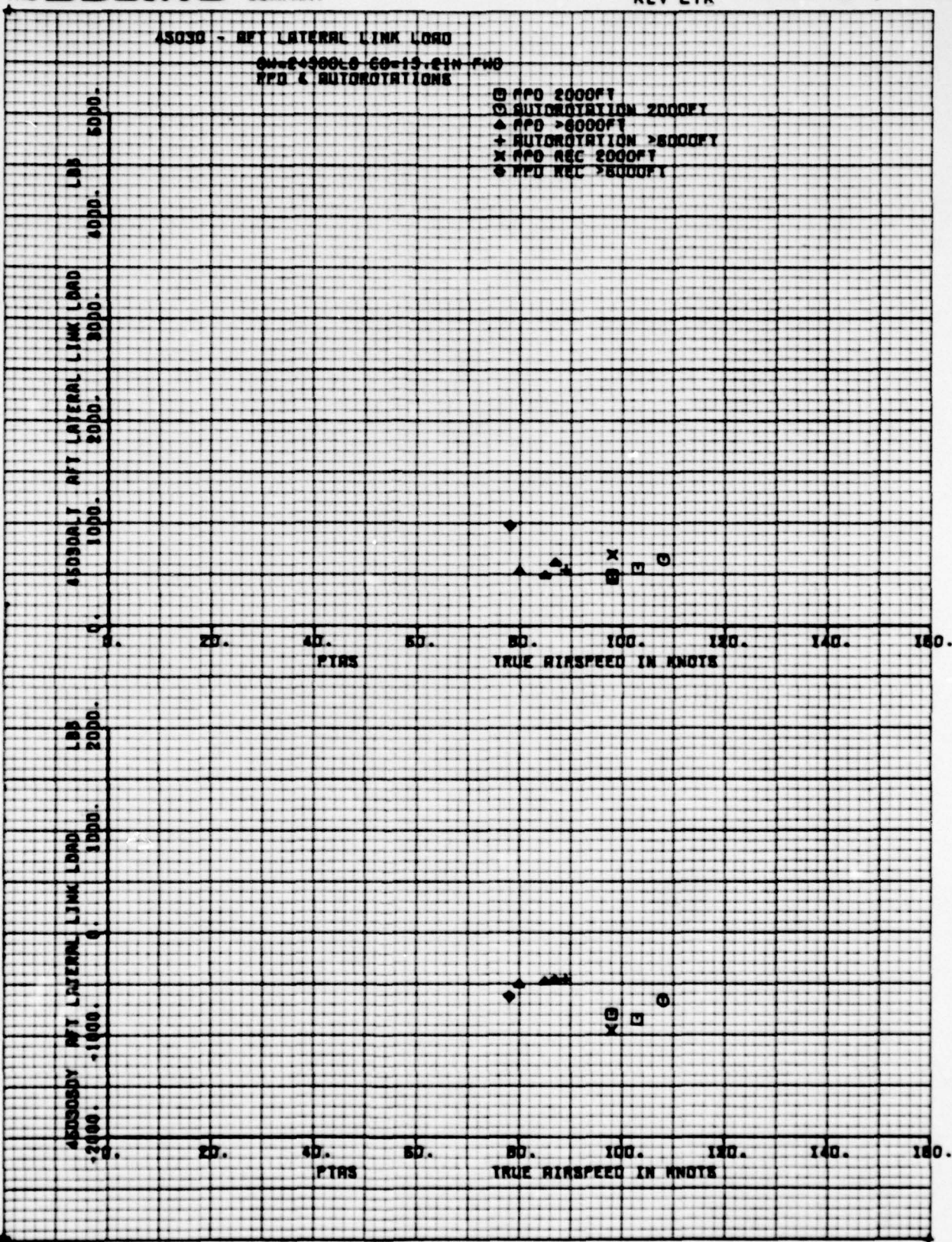
THE **BOEING** COMPANY



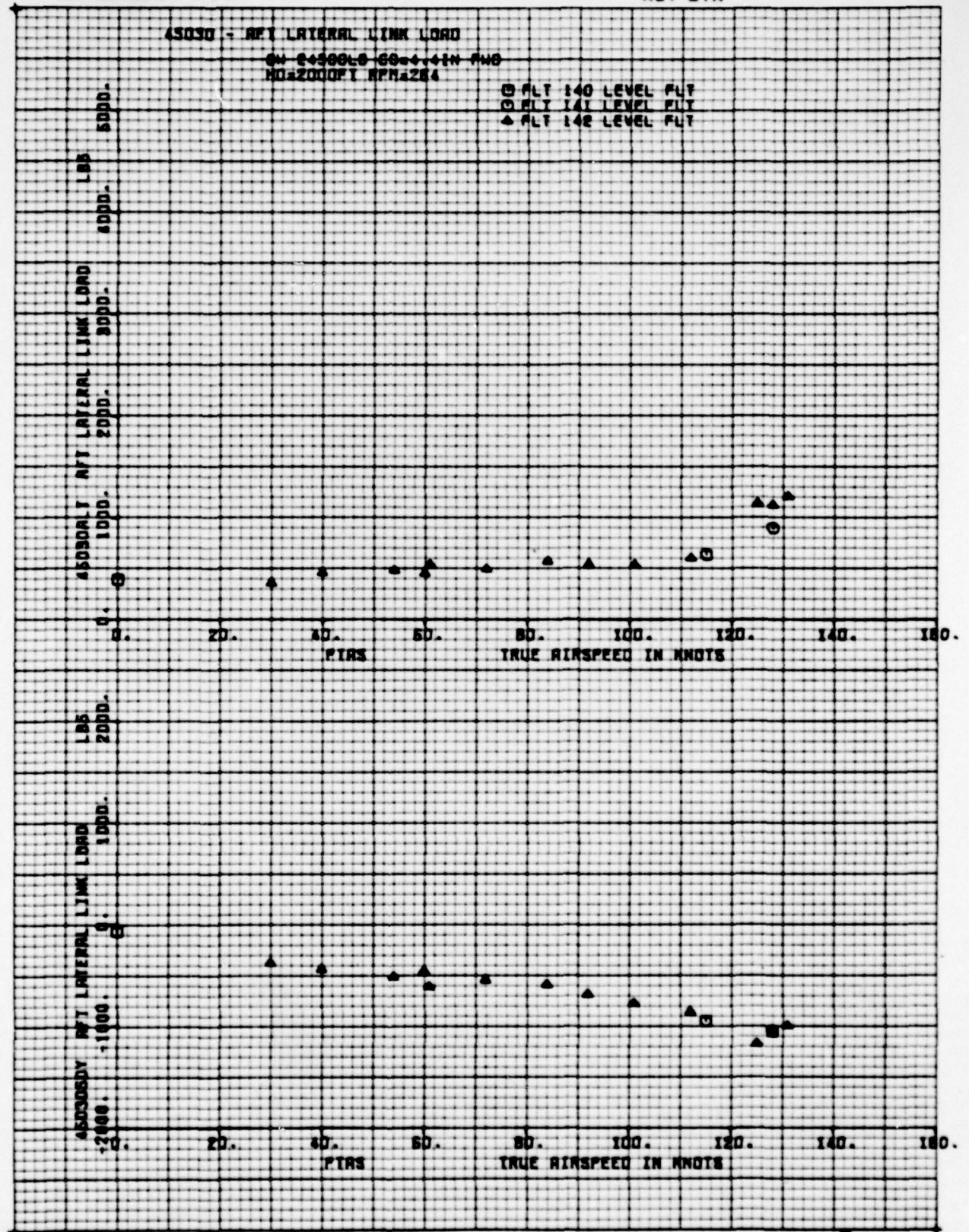
FORM 52300 (10/71)

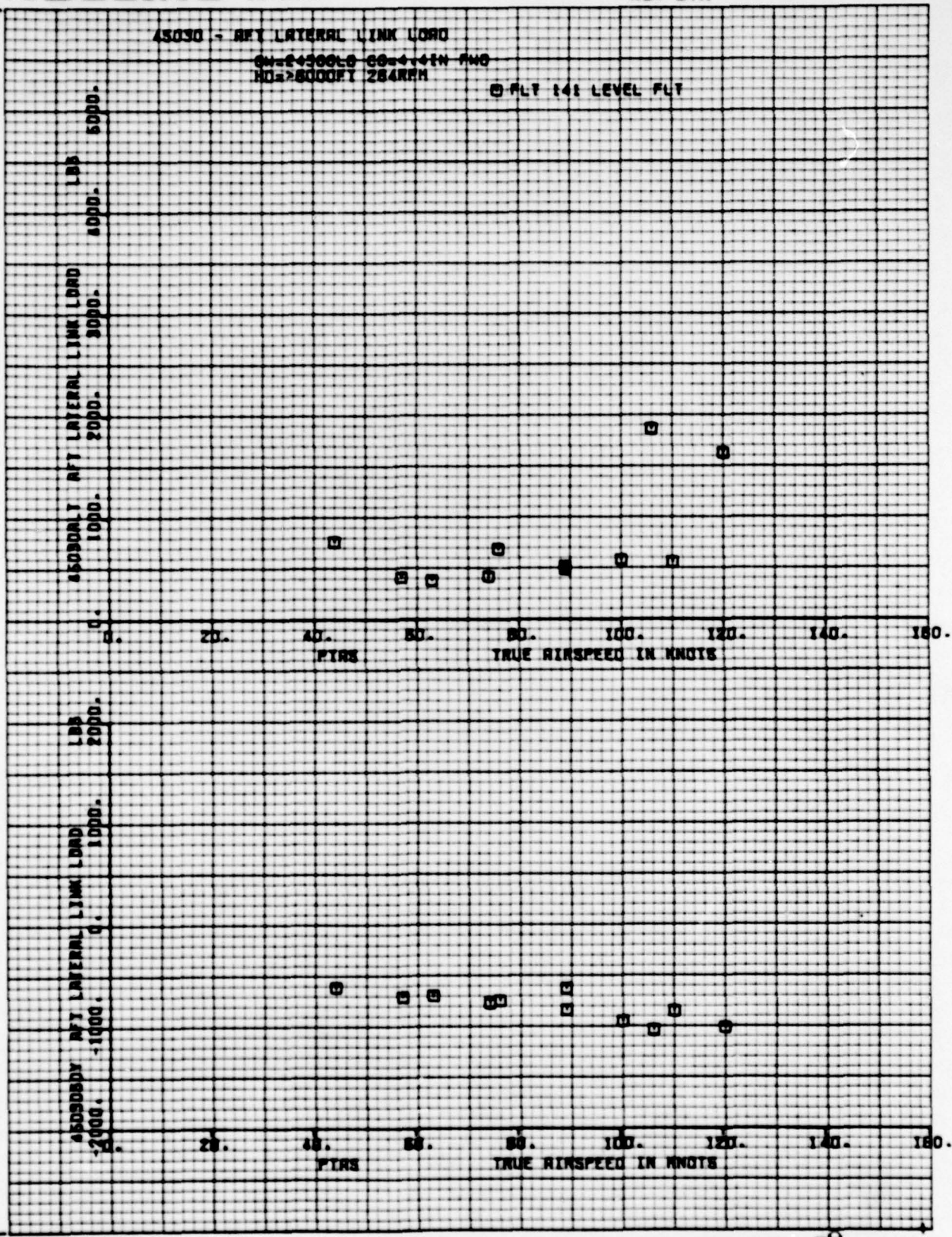


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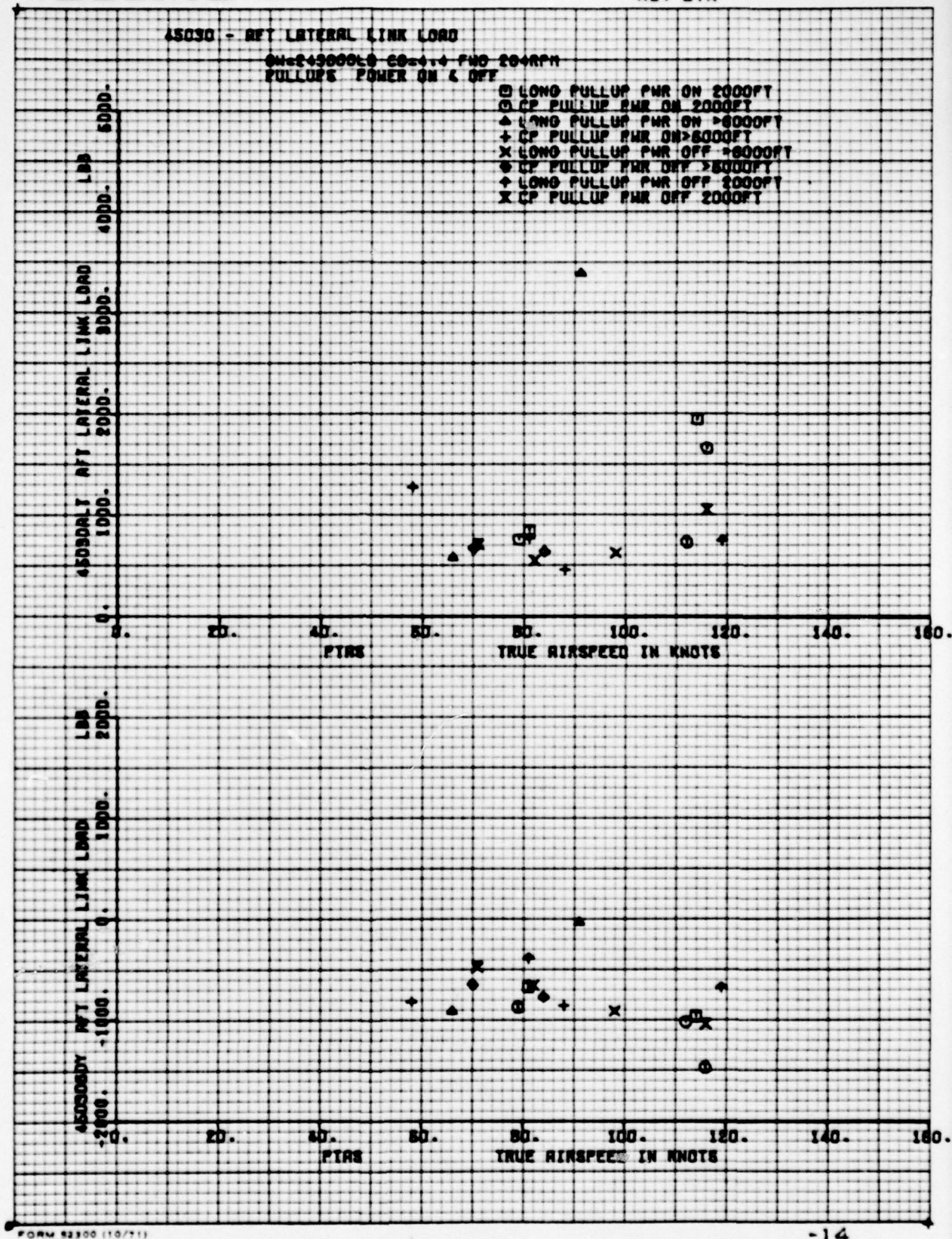


FORM 52300 (10/71)





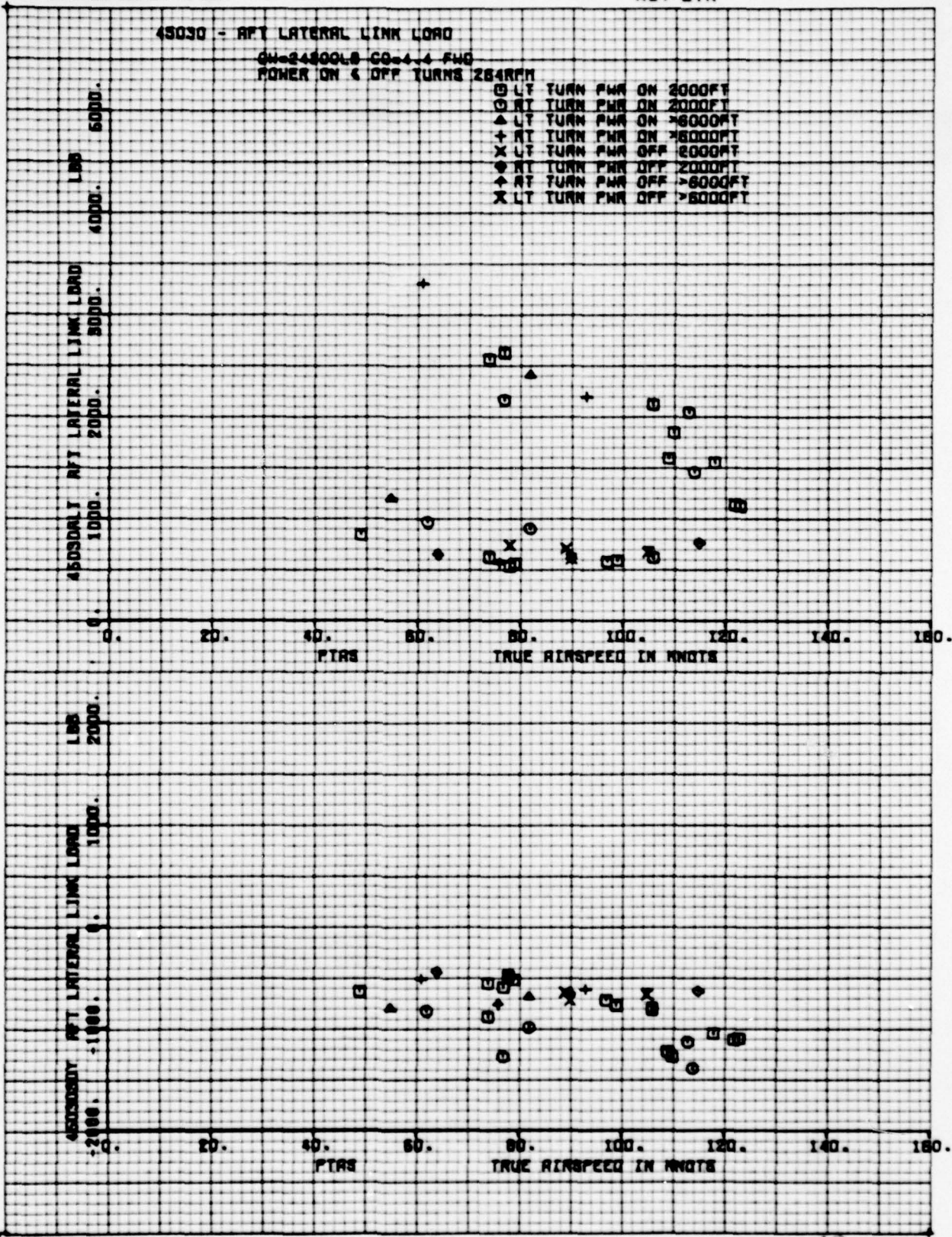
FORM 52300 (10/71)

THE **BOEING** COMPANY

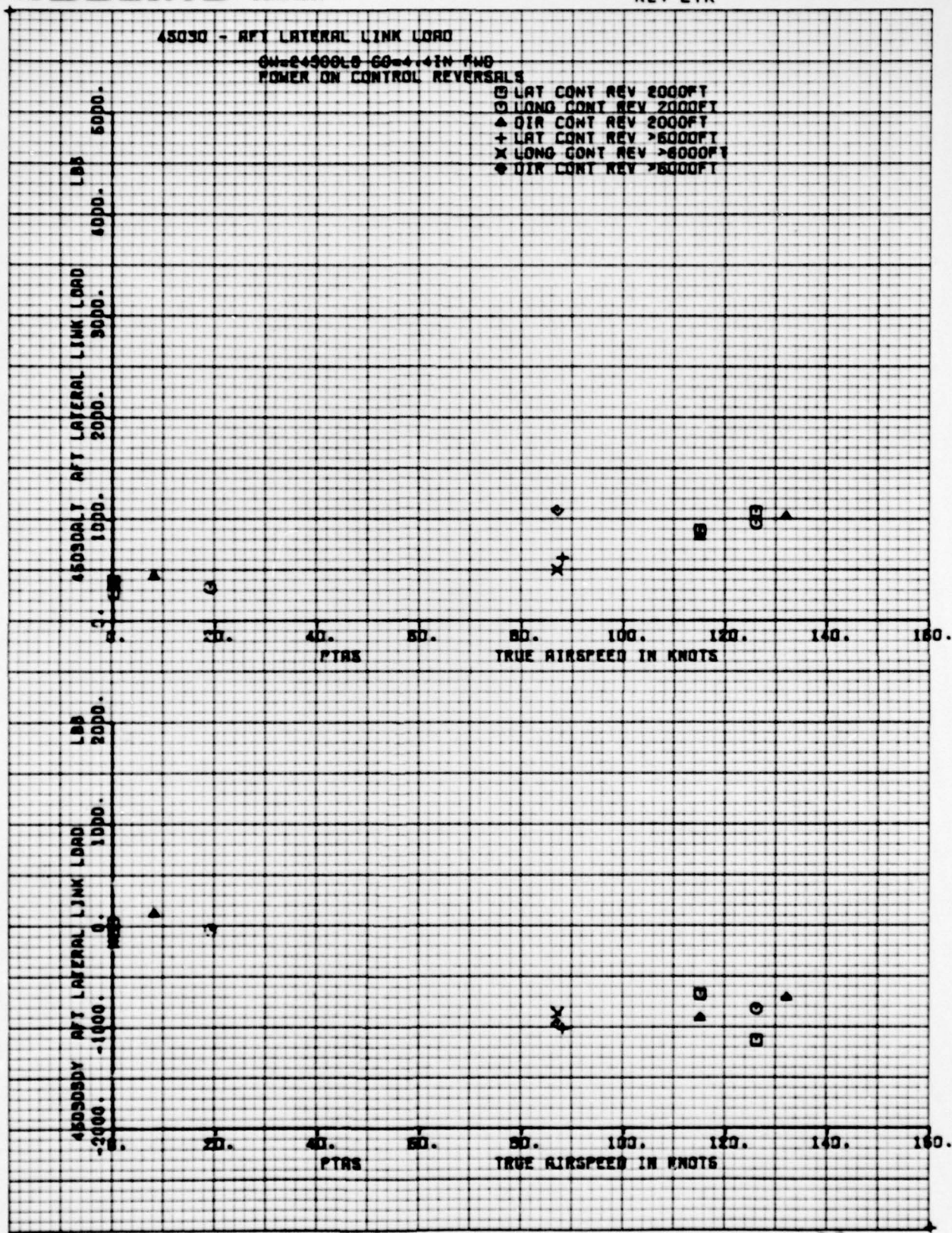
45030 - AFT LATERAL LINK LOAD

ON=24500LB CO=4.4 FWD
POWER ON & OFF TURNS 264RPM

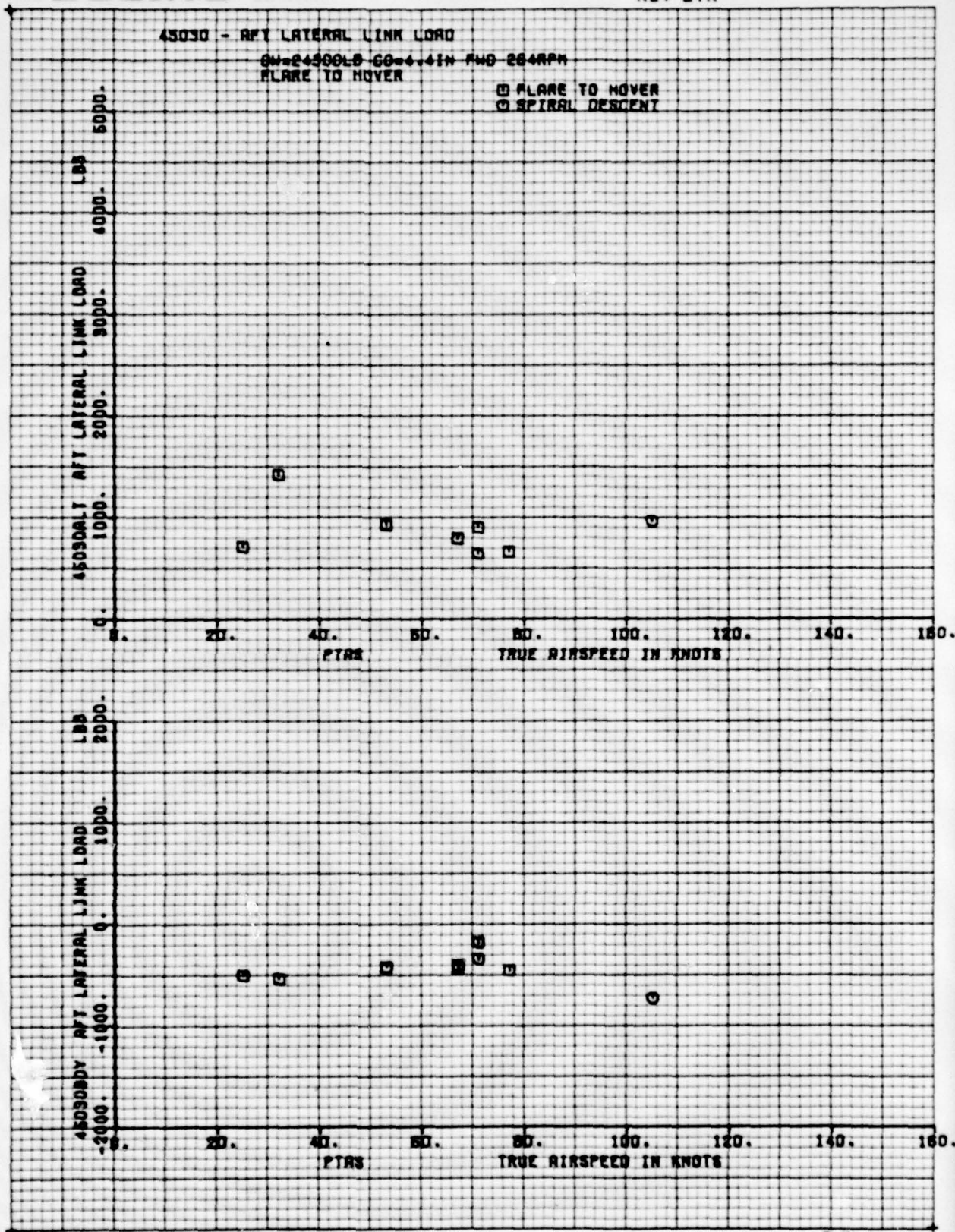
⊖ LT TURN PWR ON 2000FT
⊖ RT TURN PWR ON 2000FT
⊕ LT TURN PWR ON >6000FT
⊕ RT TURN PWR ON >6000FT
X LT TURN PWR OFF 2000FT
X RT TURN PWR OFF 2000FT
⊖ LT TURN PWR OFF >6000FT
⊖ RT TURN PWR OFF >6000FT

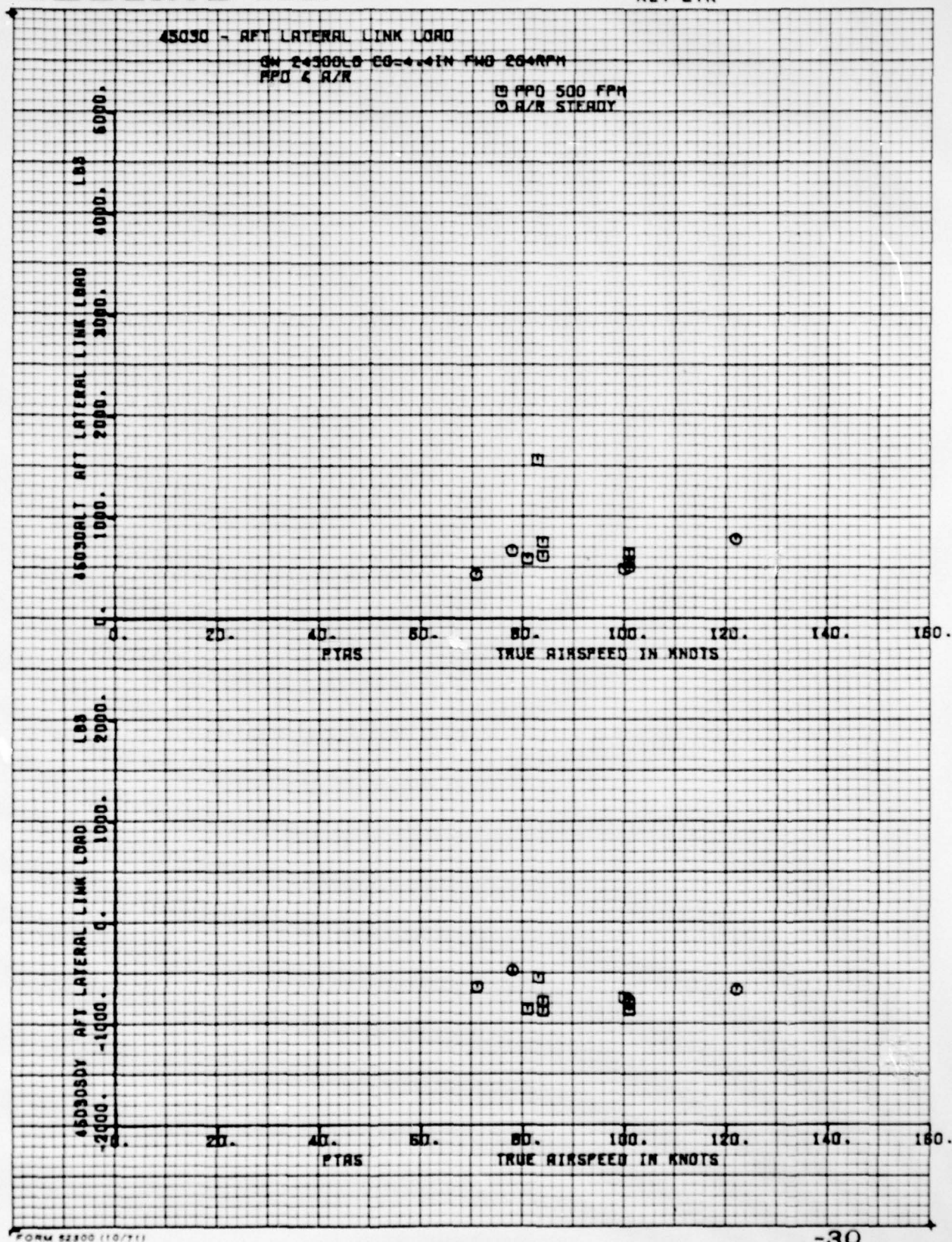


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FORM 52300 (10/71)



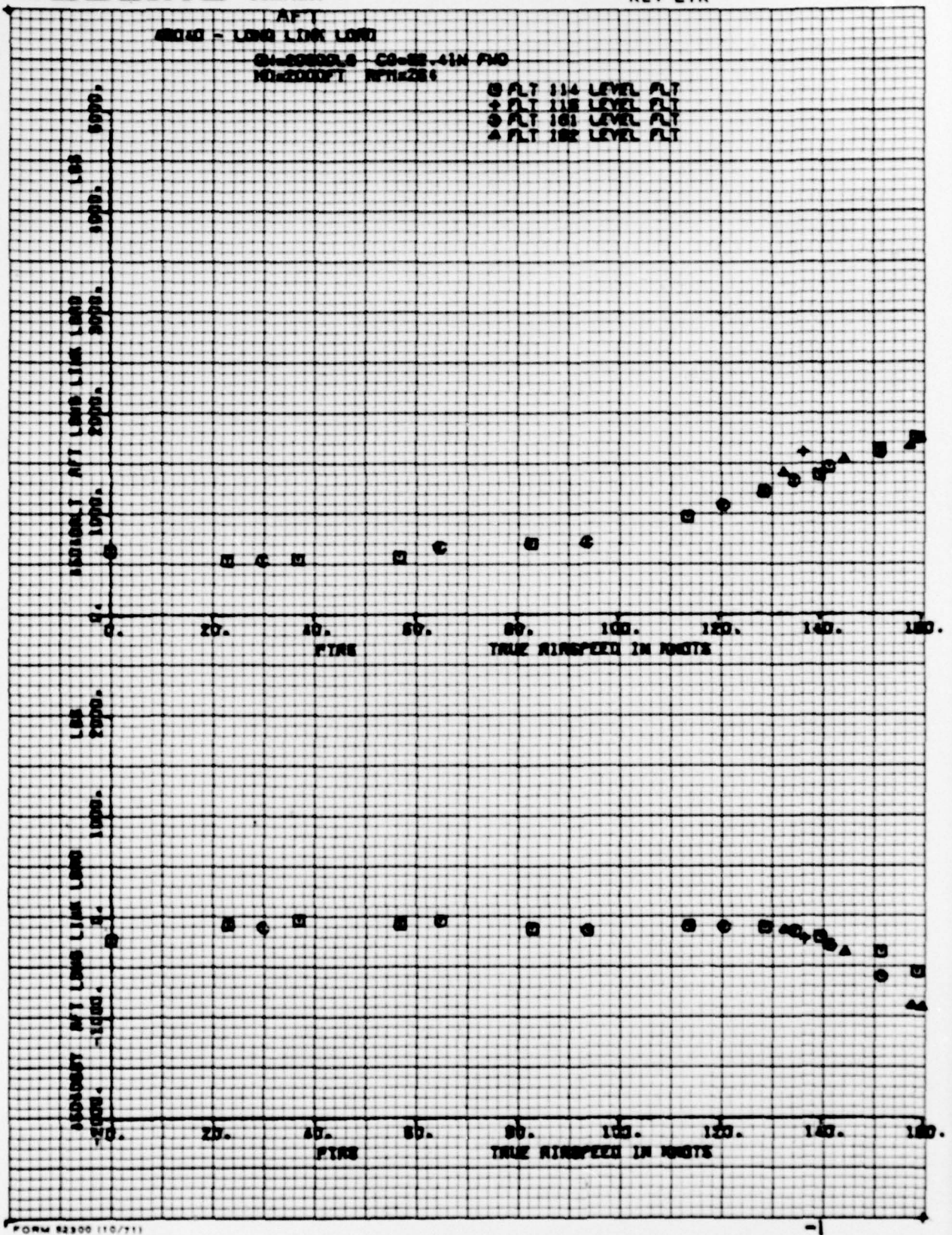
THE **BOEING** COMPANY

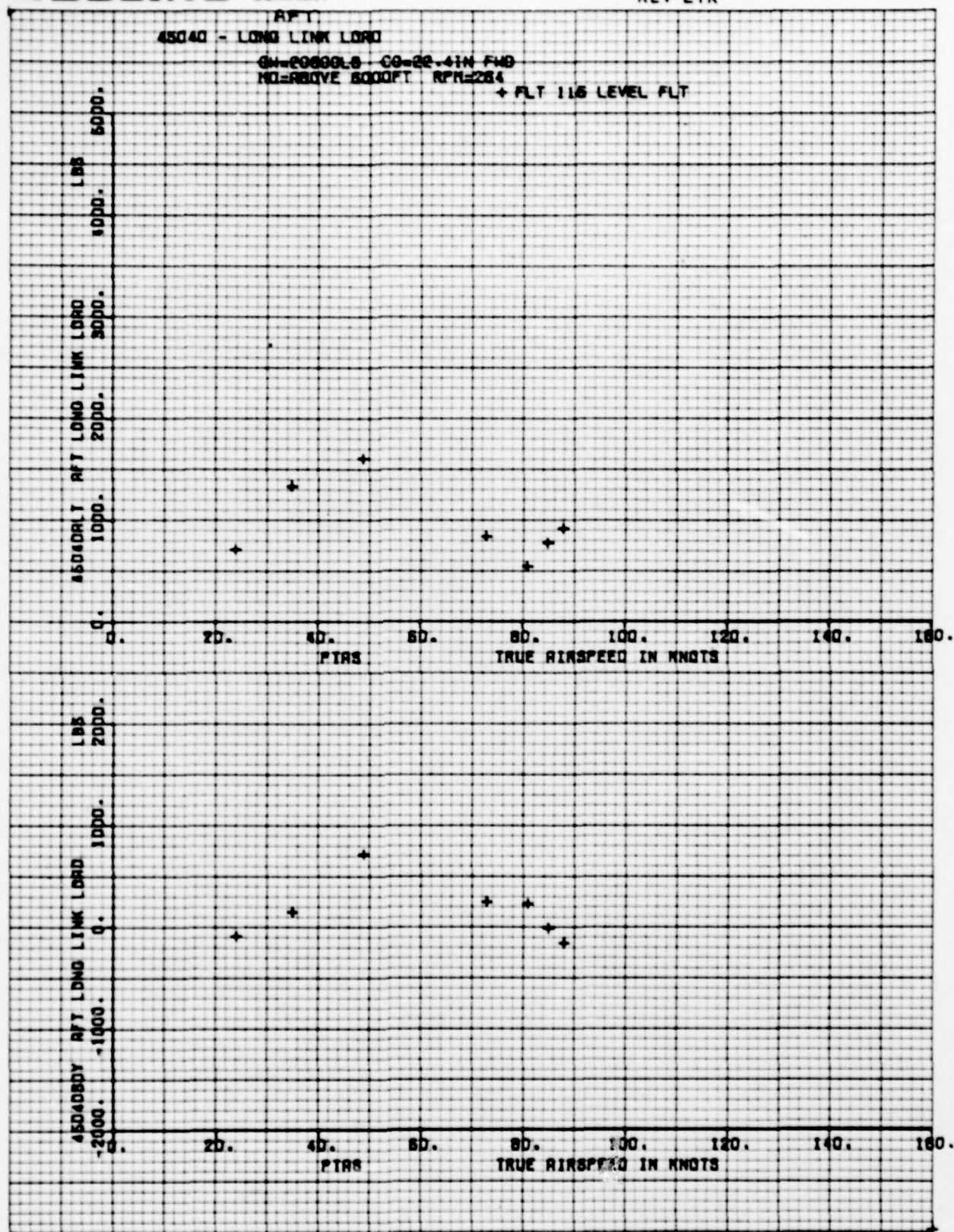
THE **BOEING** COMPANY

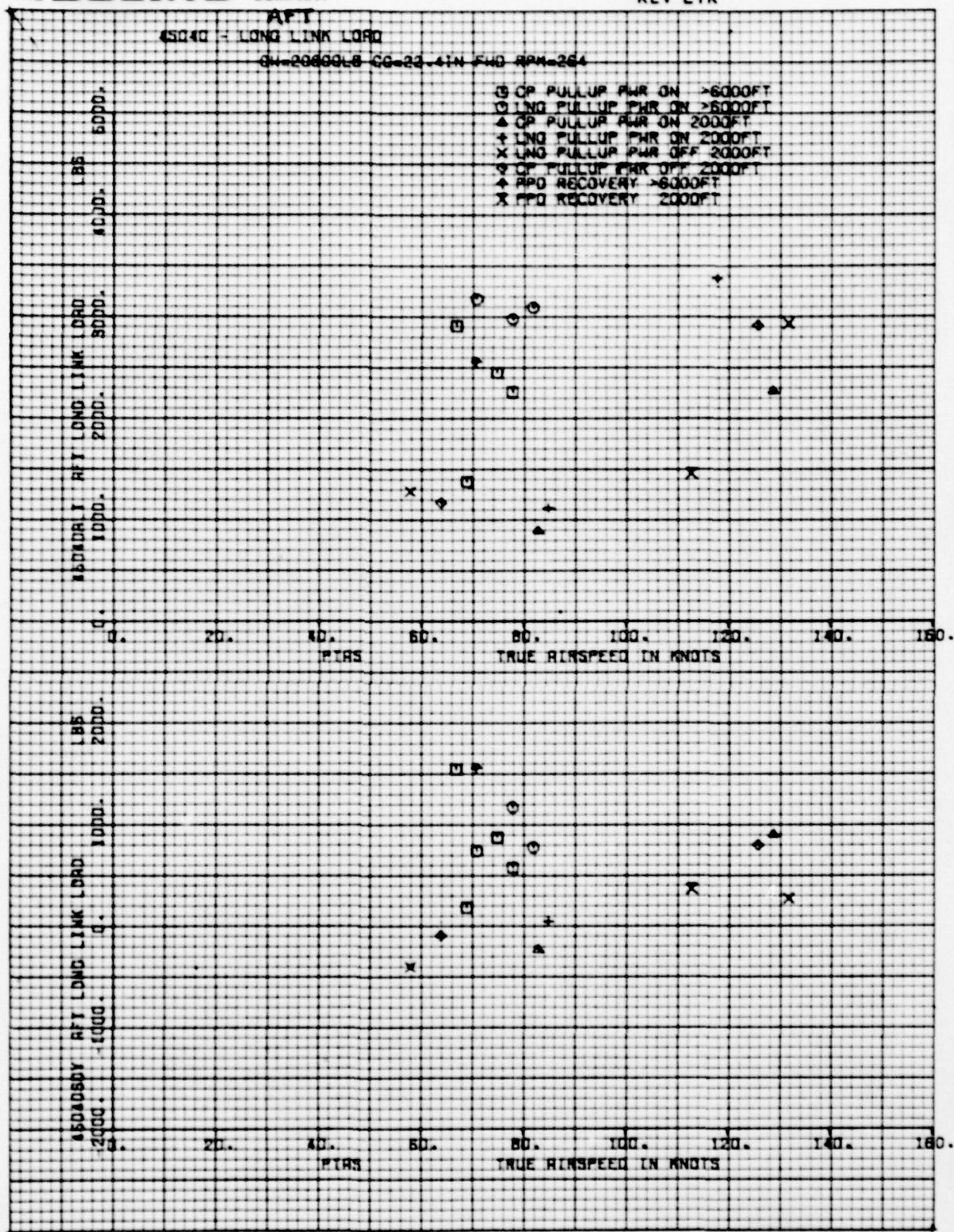
PREPARED BY: J. Bendo
CHECKED BY:
DATE: 8/28/78

NUMBER D210-11168-3
REV LTR Volume 7
MODEL NO.

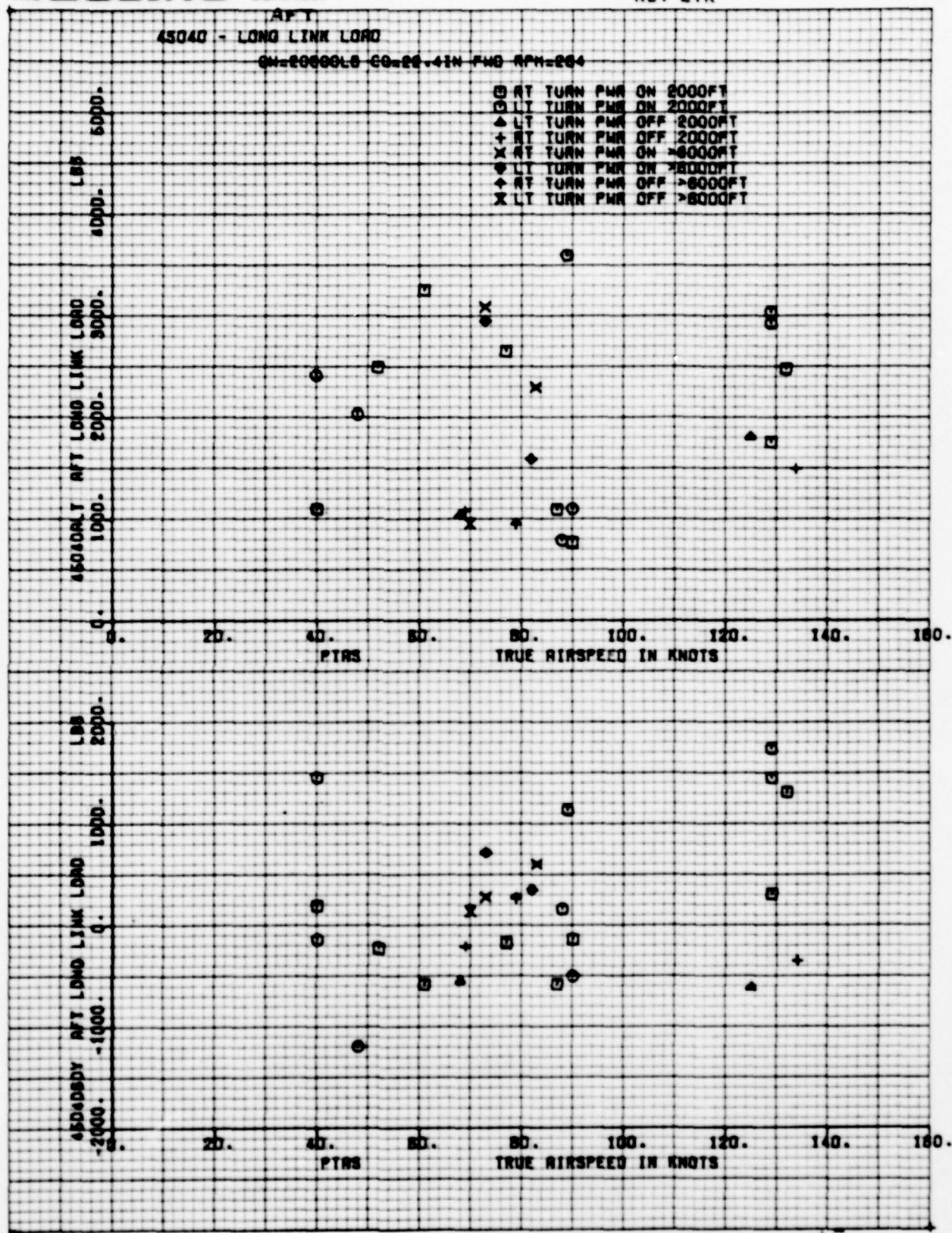
4.9 Aft Longitudinal Link

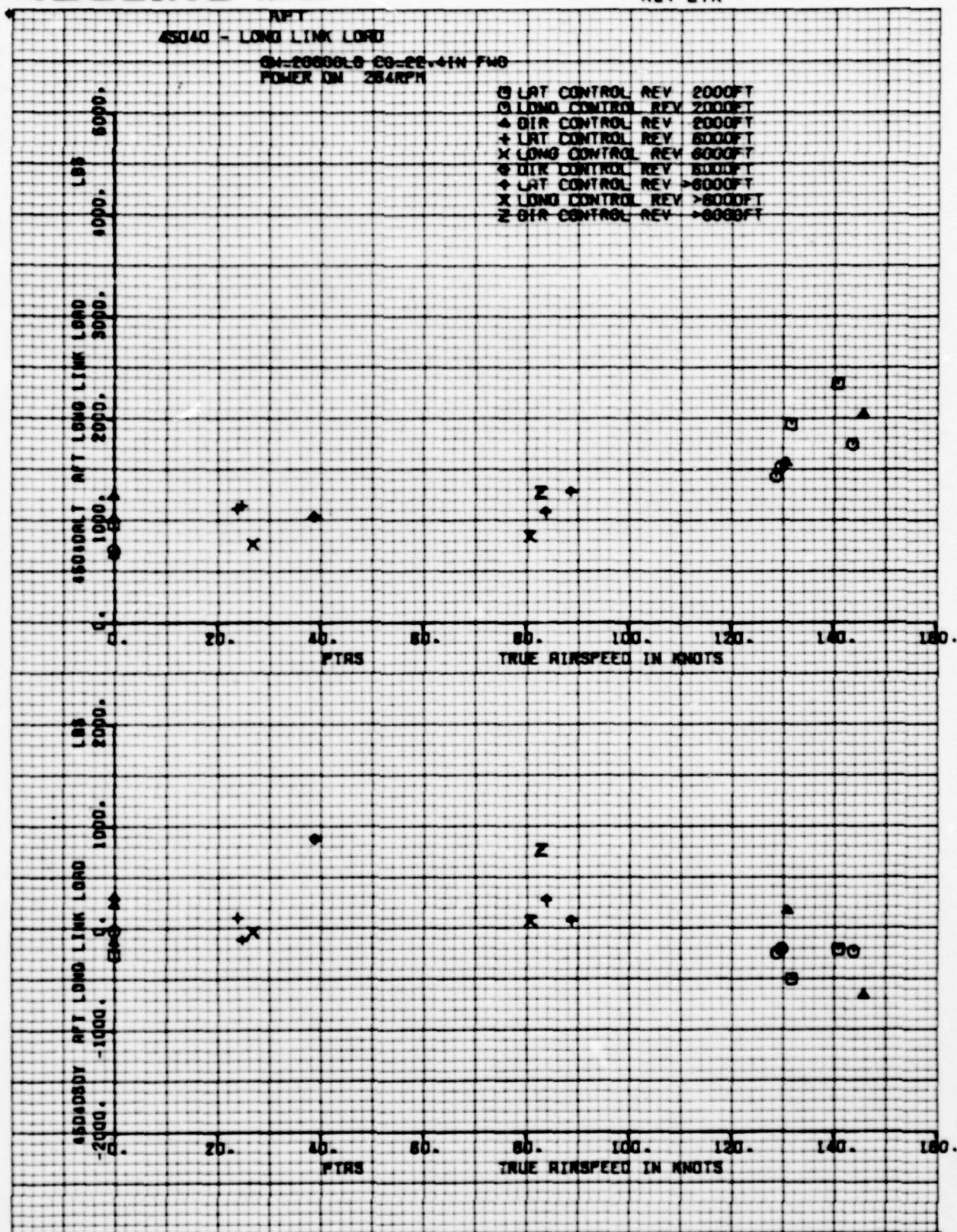






FORM 52900 (10/71)



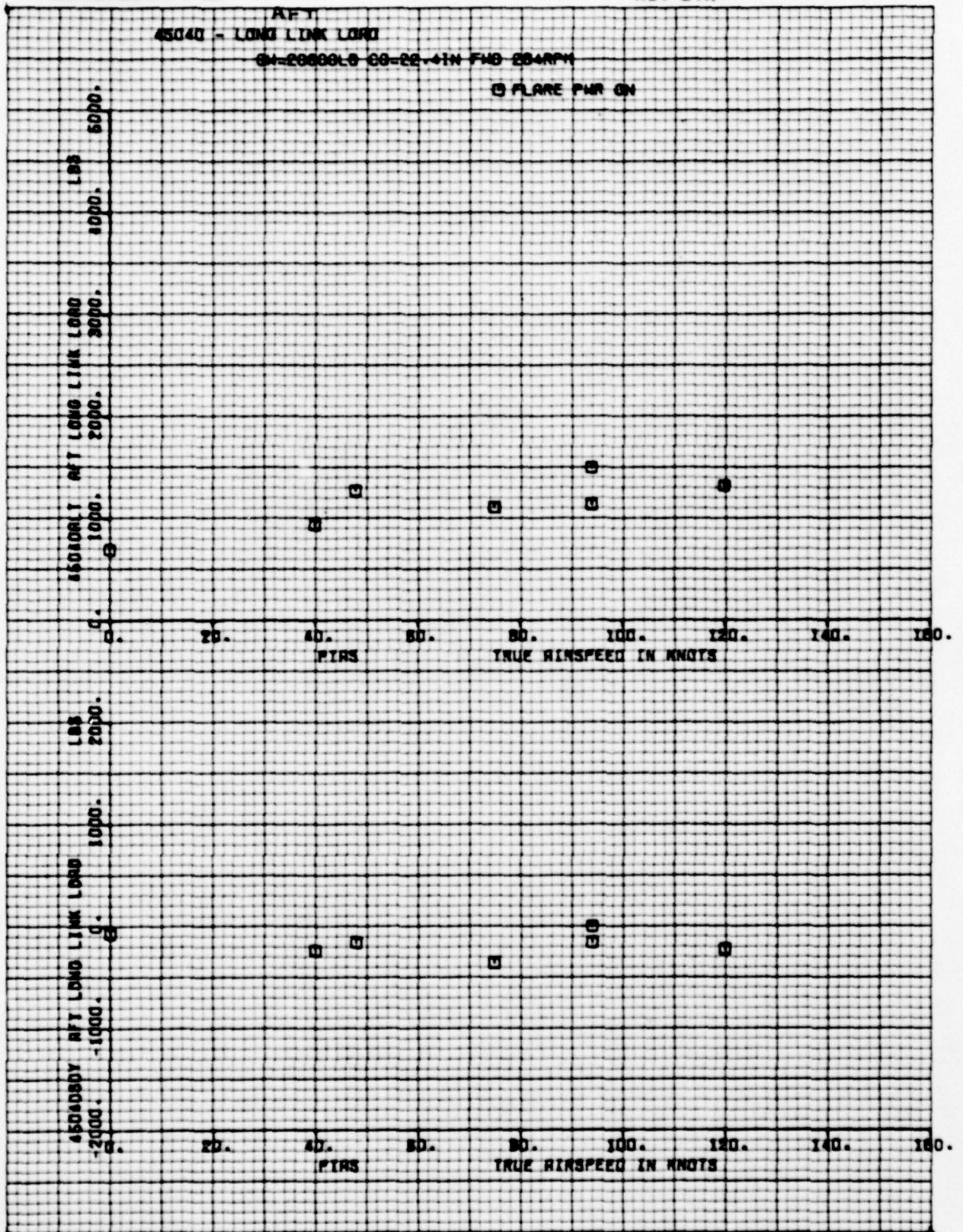
THE **BOEING** COMPANY

FORM 52300 (10/71)

SHEET 305

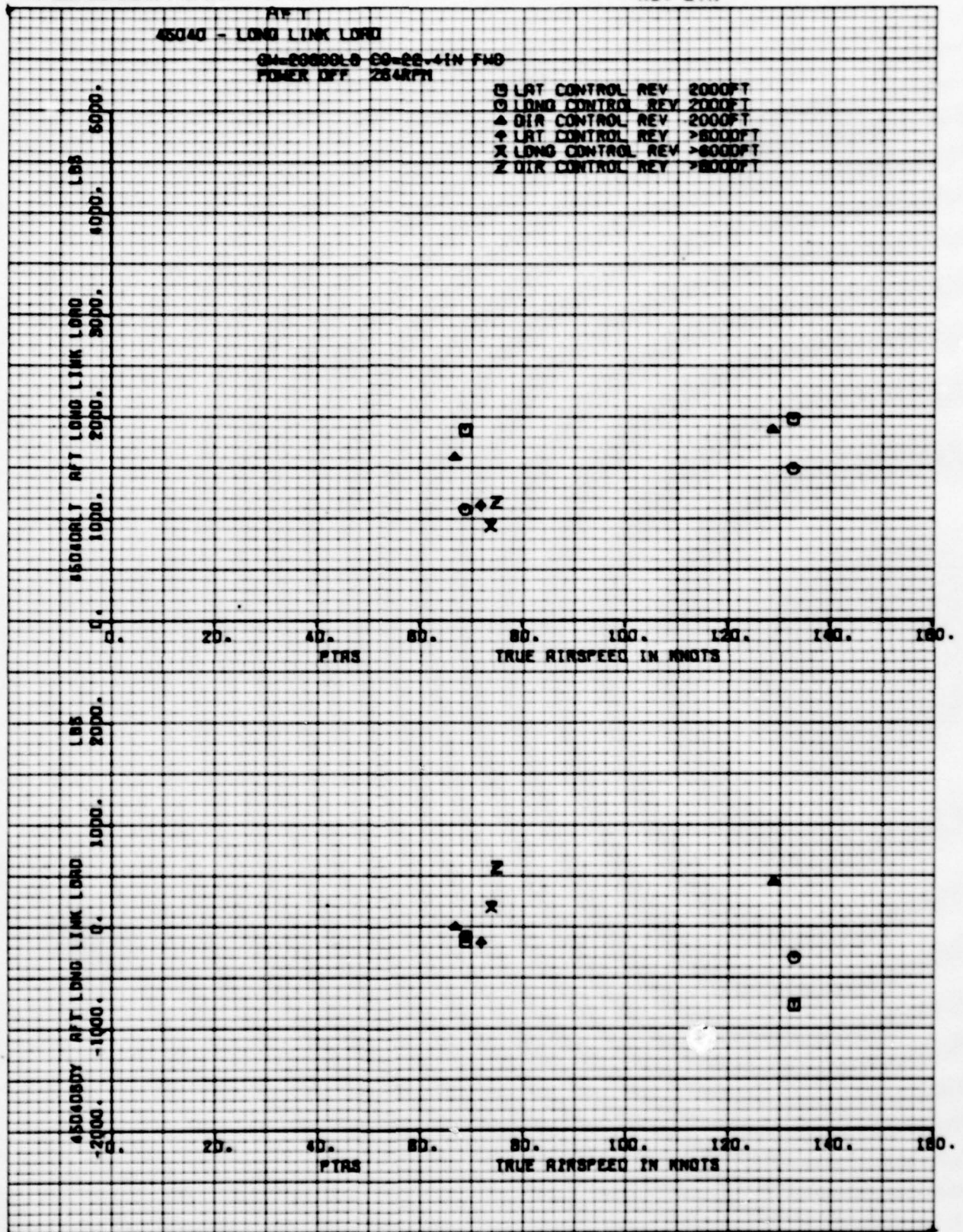
-19

THE **BOEING** COMPANY



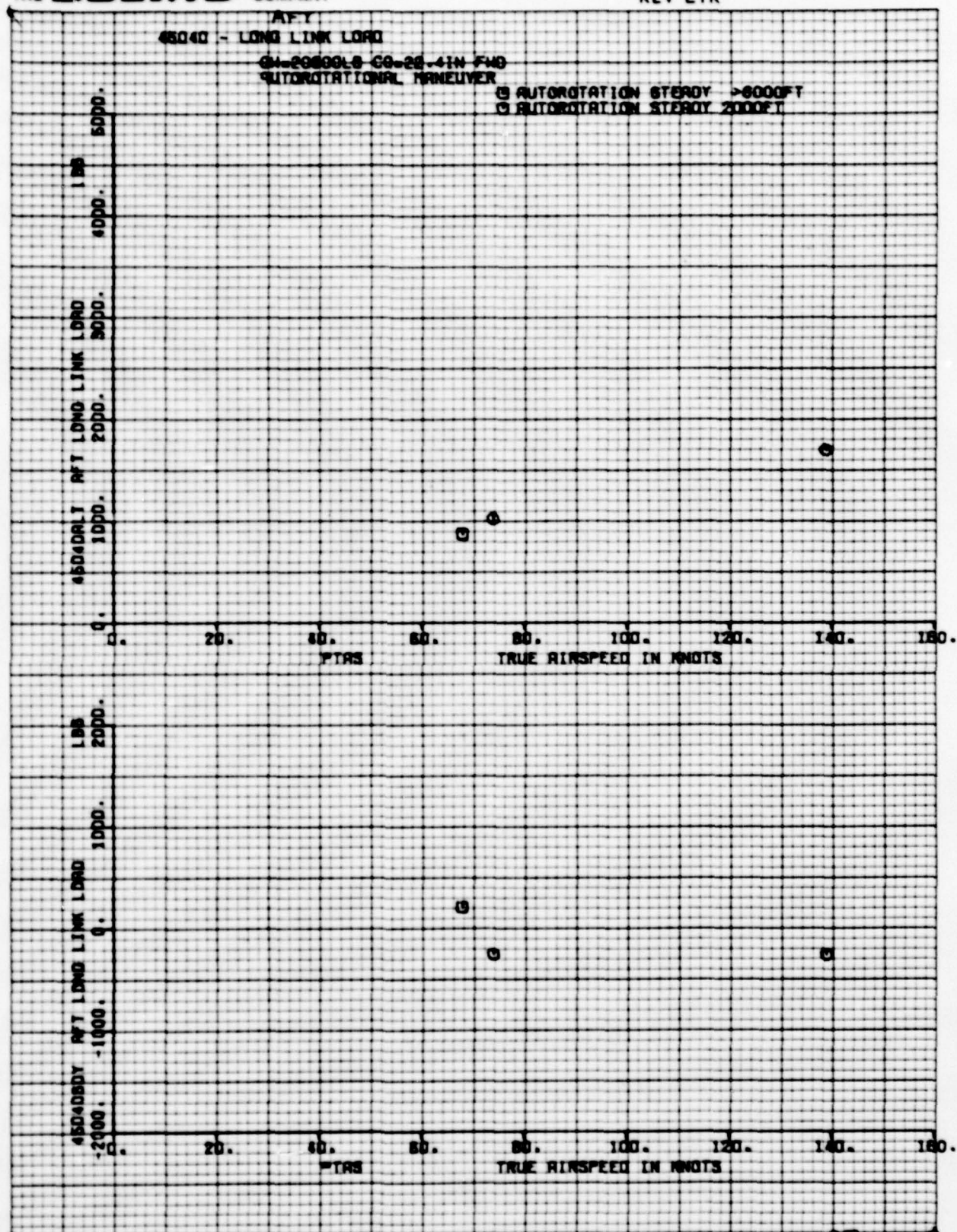
FORM 52300 (10/71)

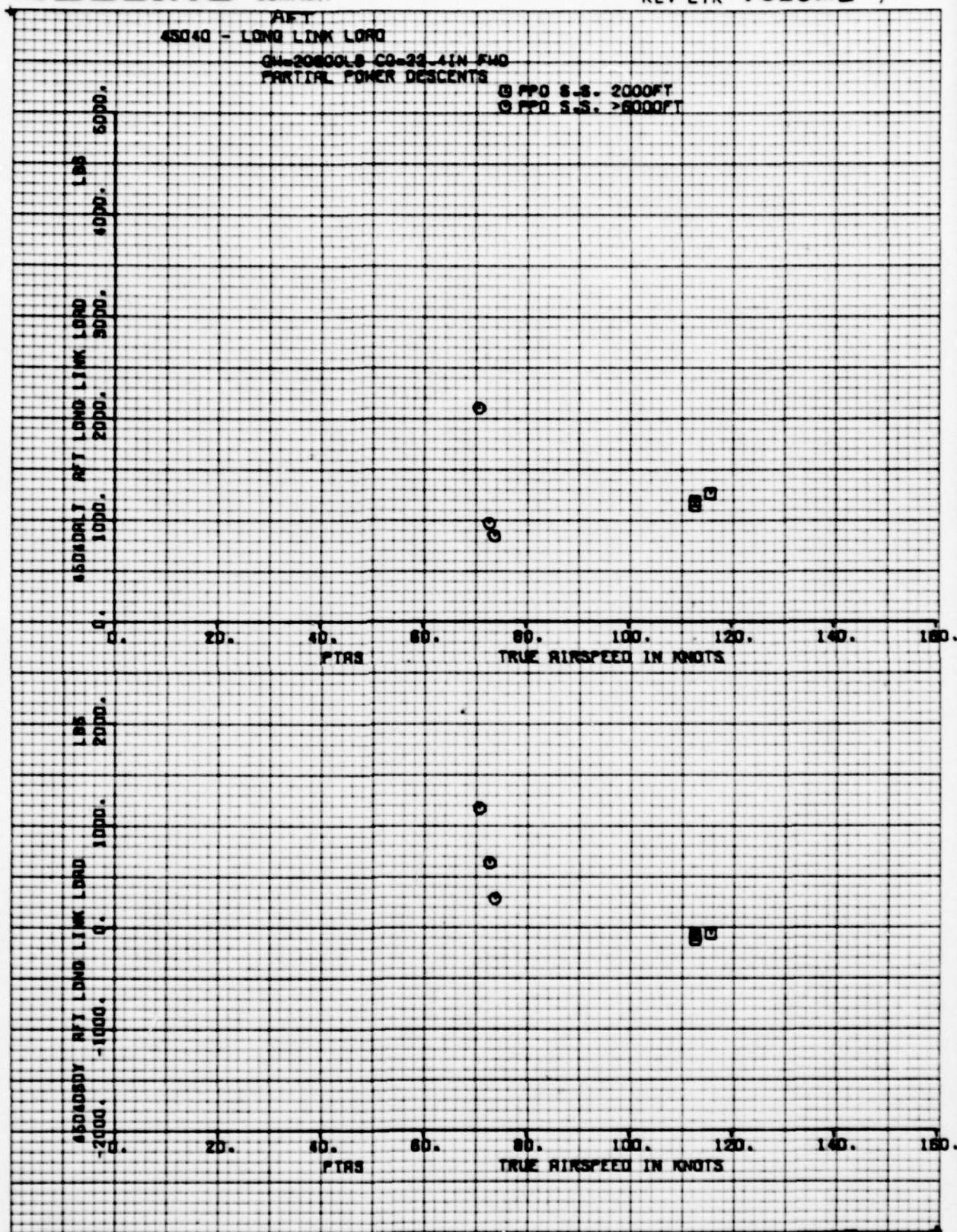
THE **BOEING** COMPANY



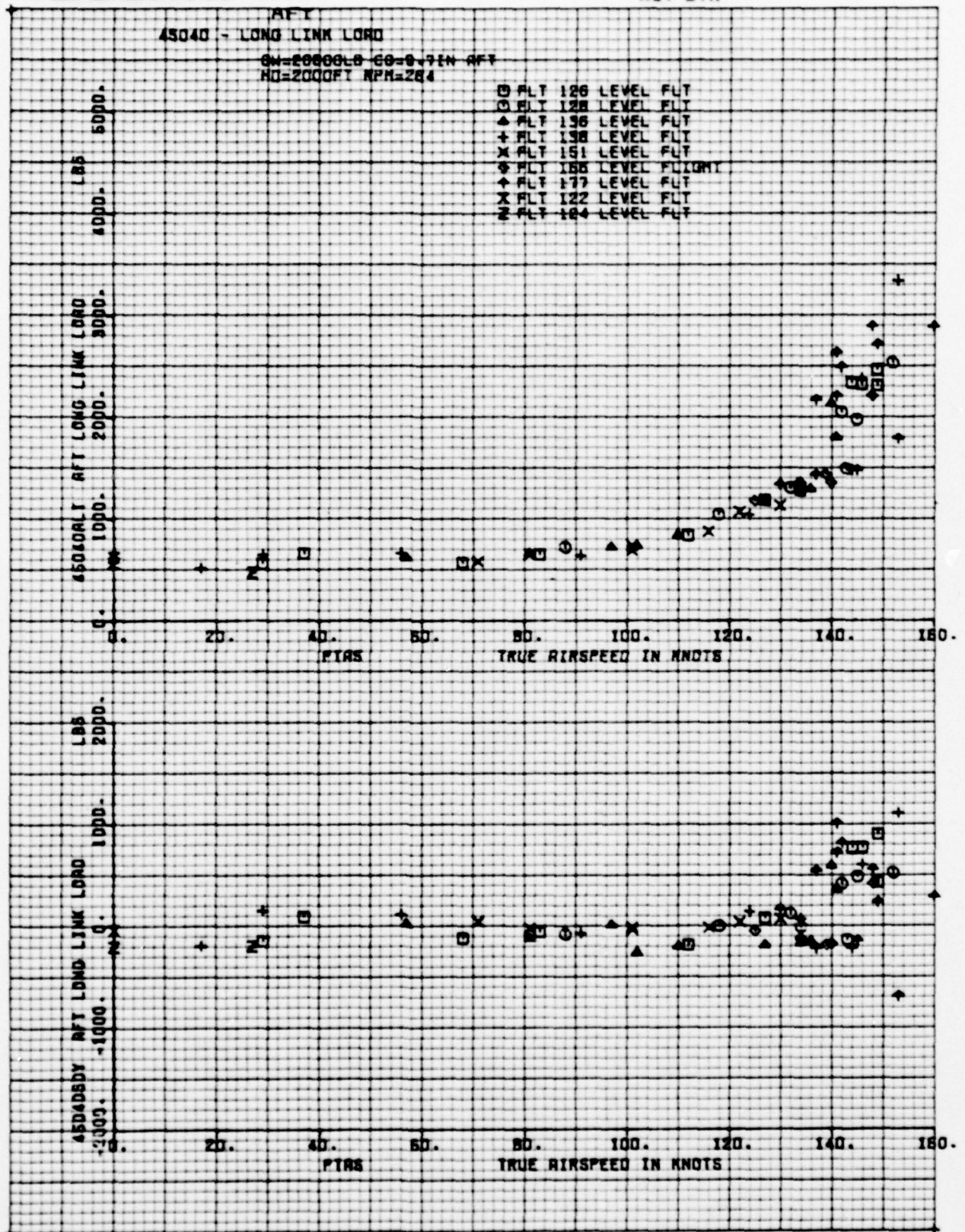
FORM 52300 (10/71)

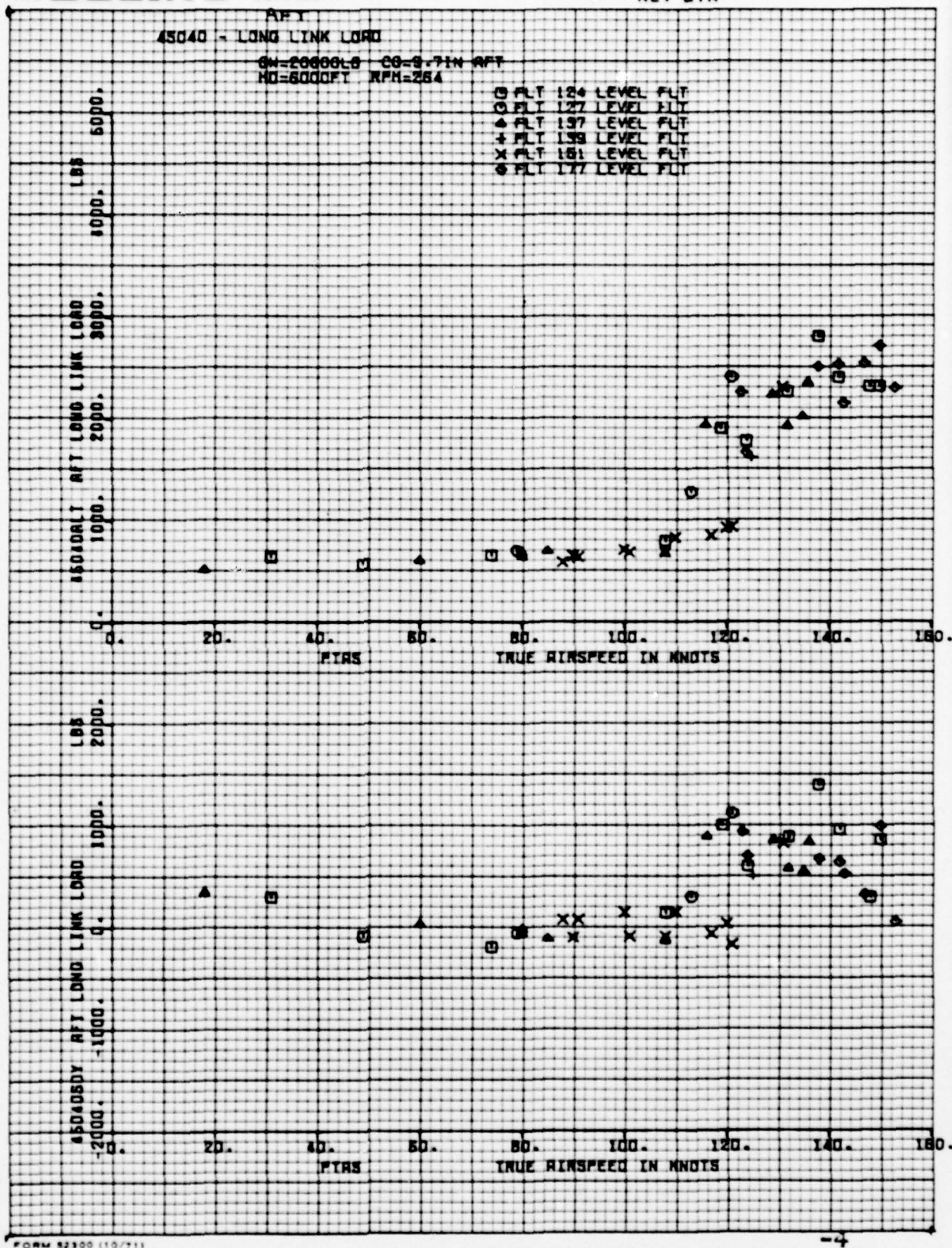
THE **BOEING** COMPANY

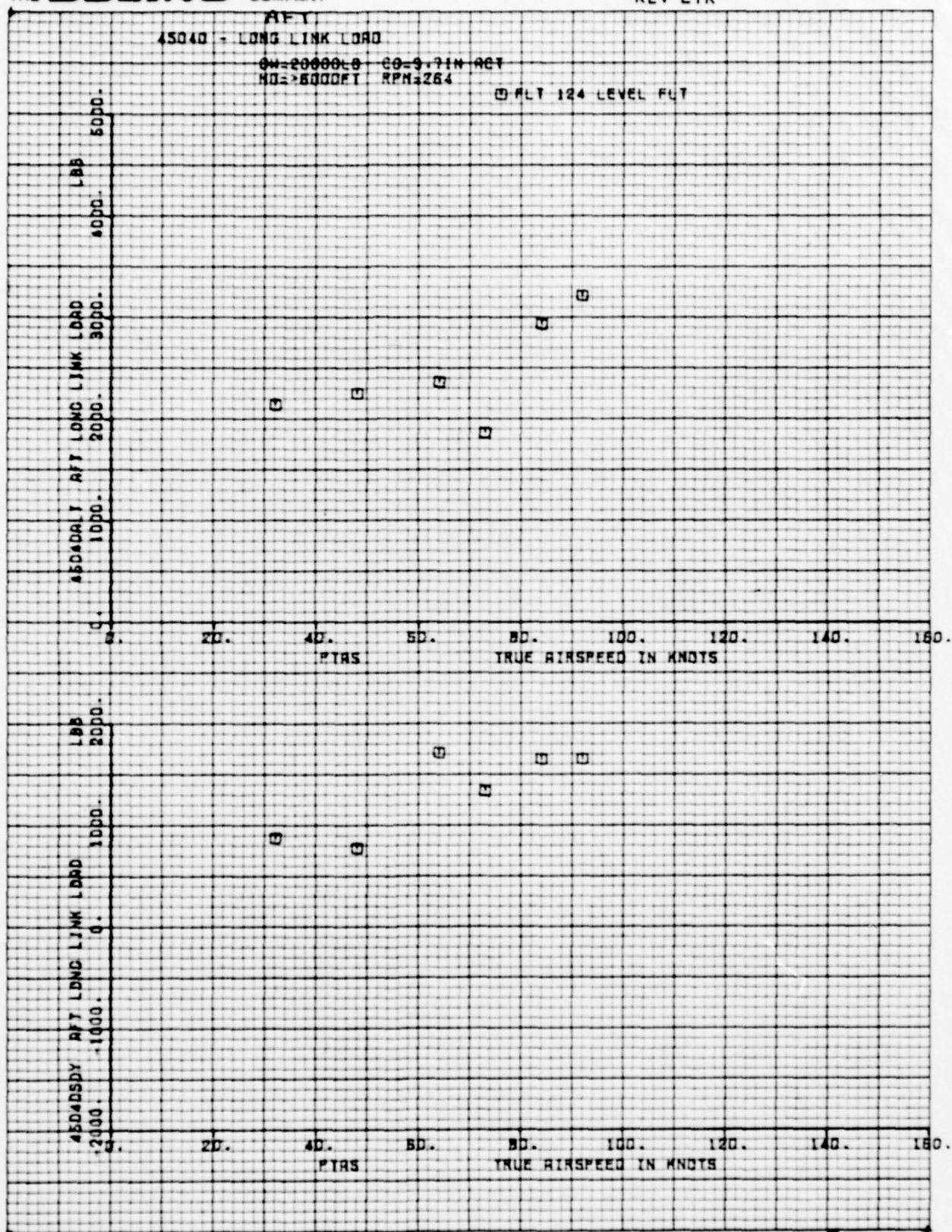




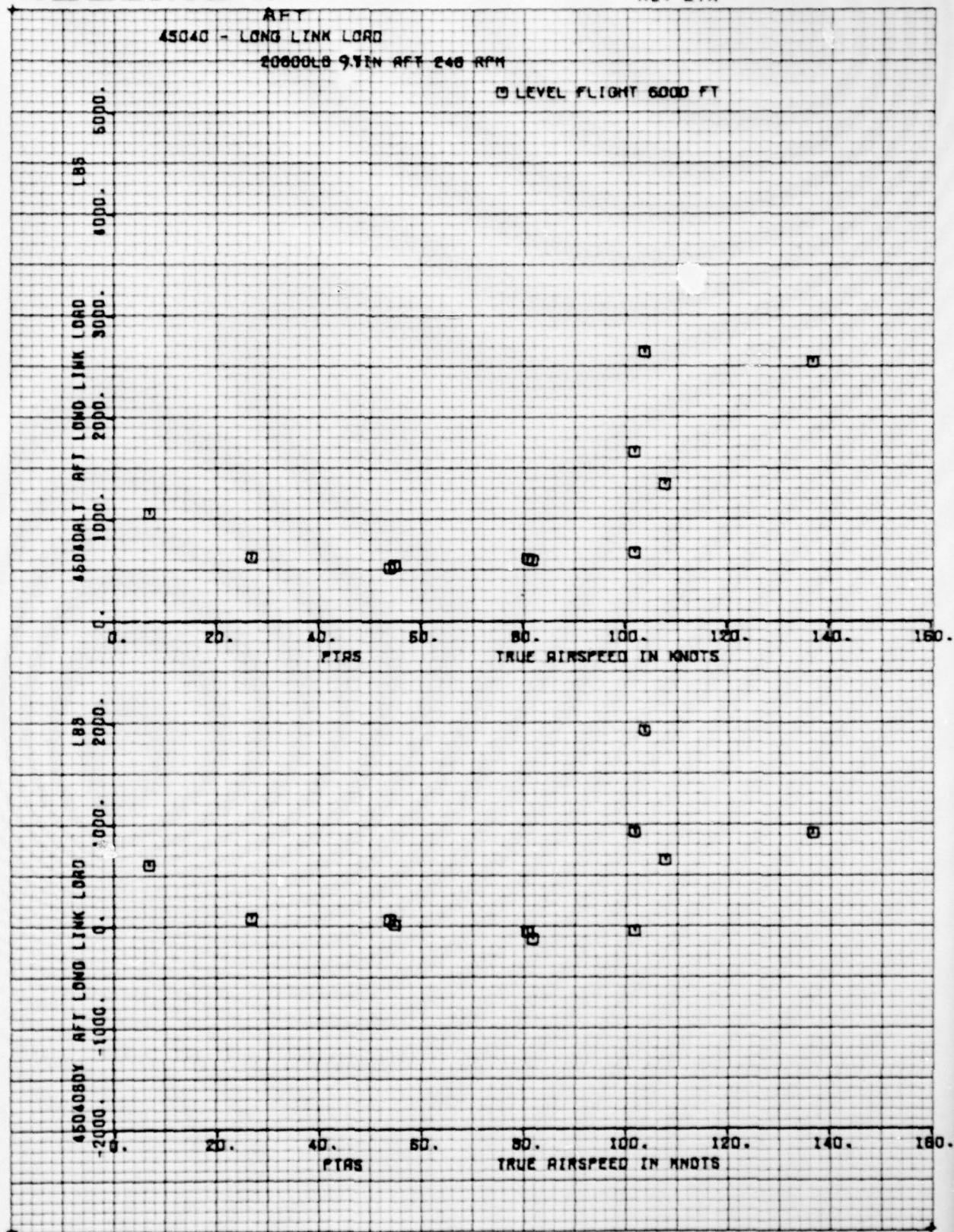
FORM 52900 (10/71)



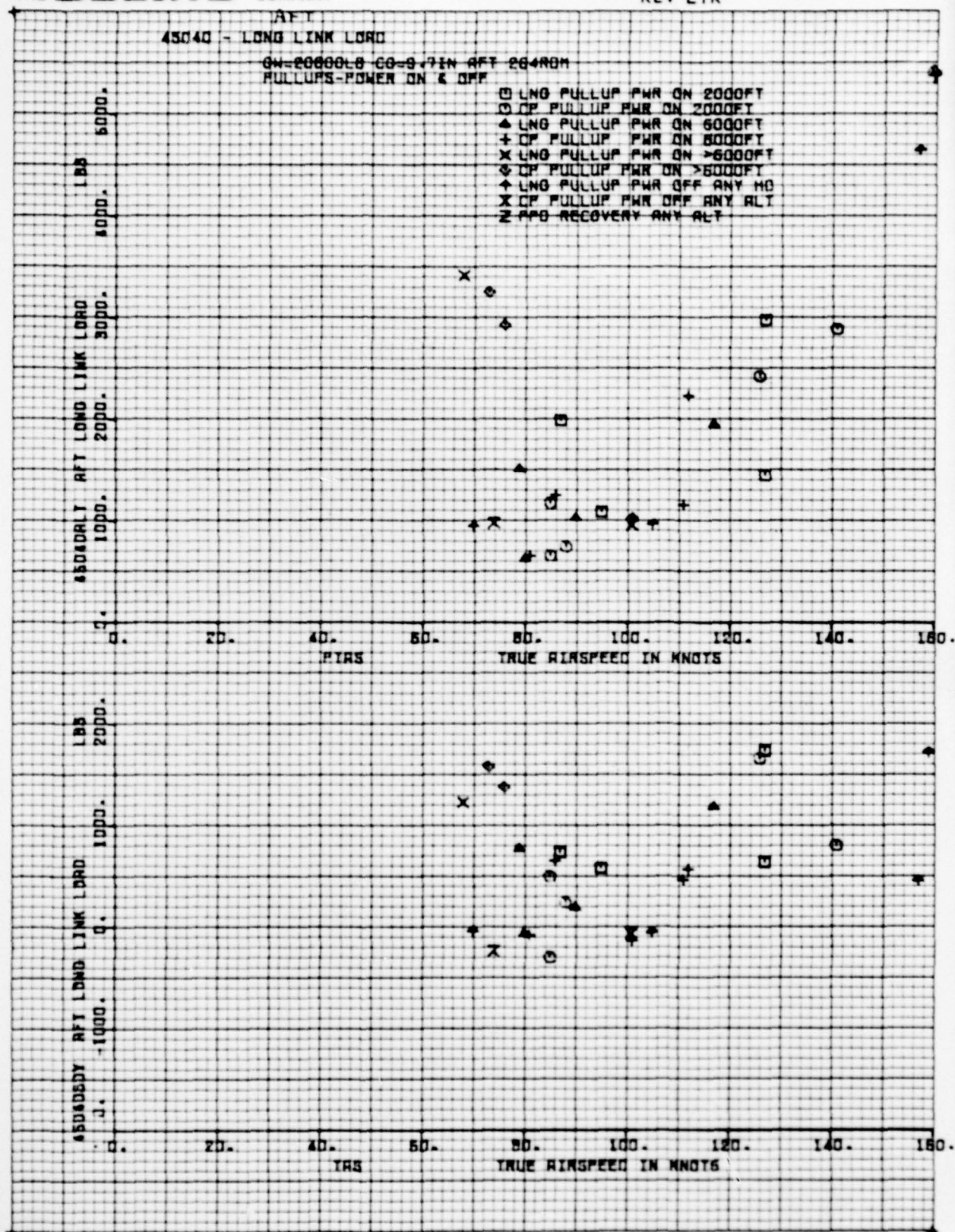




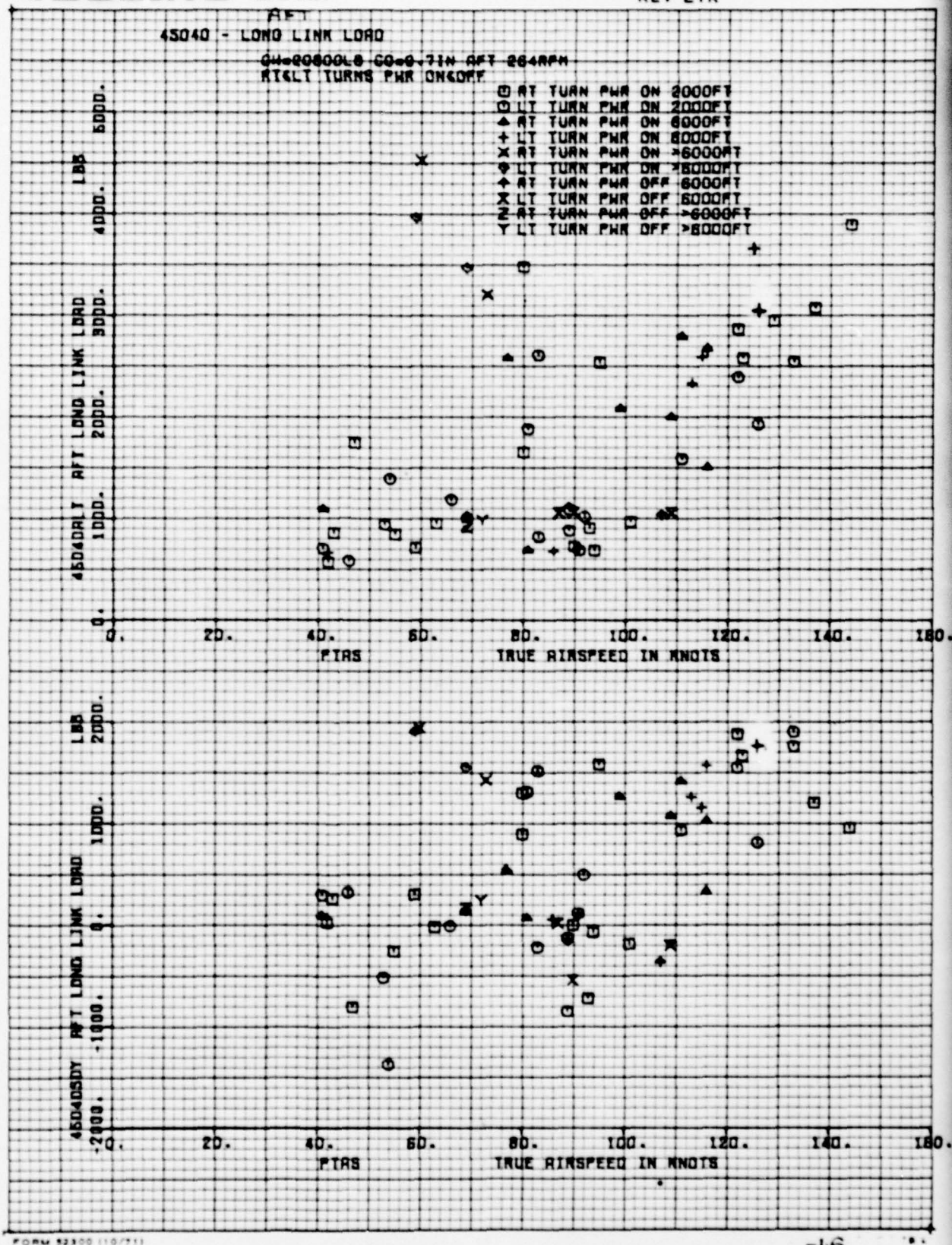
THE **BOEING** COMPANY



FORM 52300 (10/71)

THE **BOEING** COMPANY

FORM 52300 (10/71)



45040 - LONG LINK LOAD

45040DY AFT LONG LINK LOAD

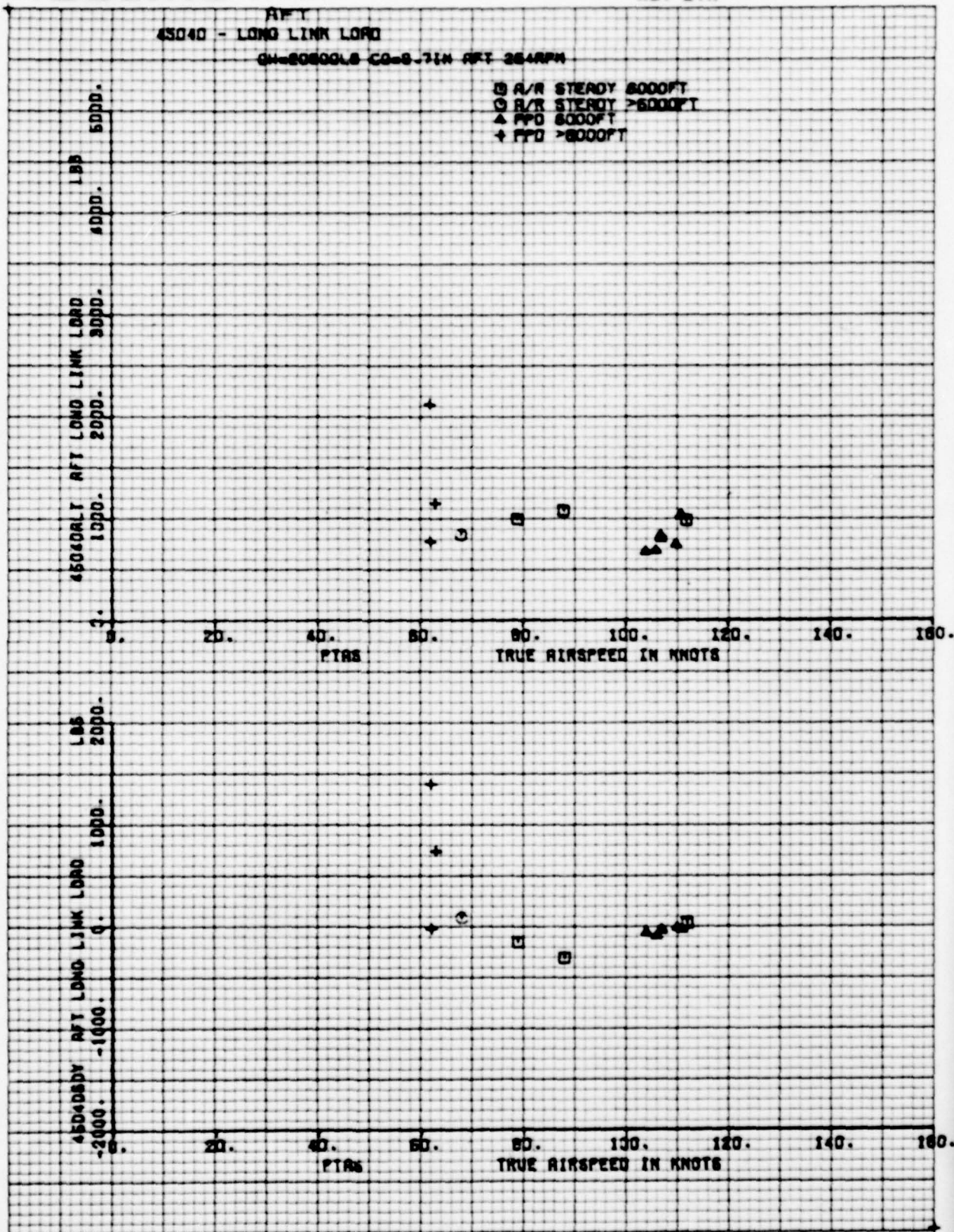
45040DDY AFT LONG LINK LOAD

TRUE WINDSPEED IN KNOTS

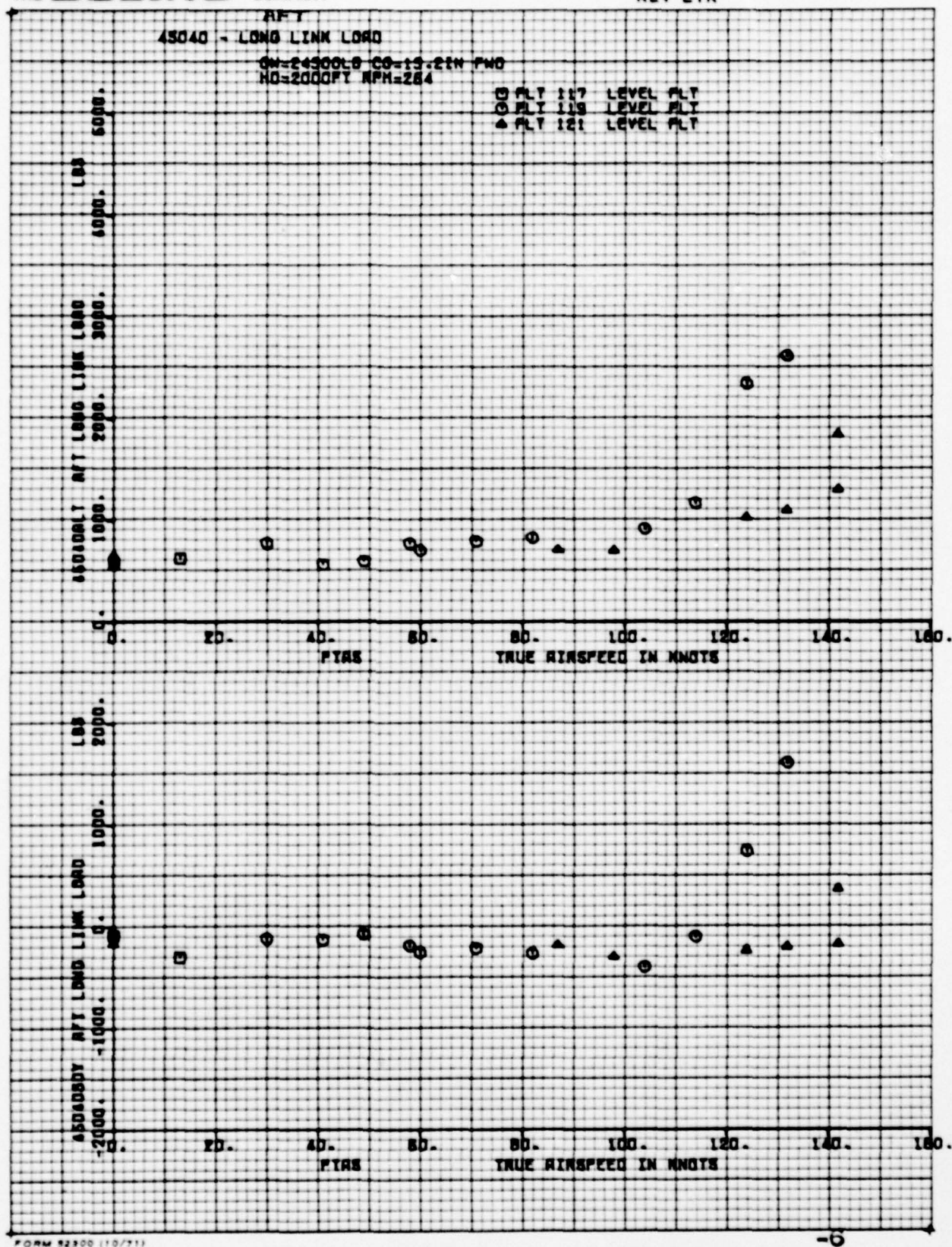
TRUE WINDSPEED IN KNOTS

FORM 52300 (10/71)

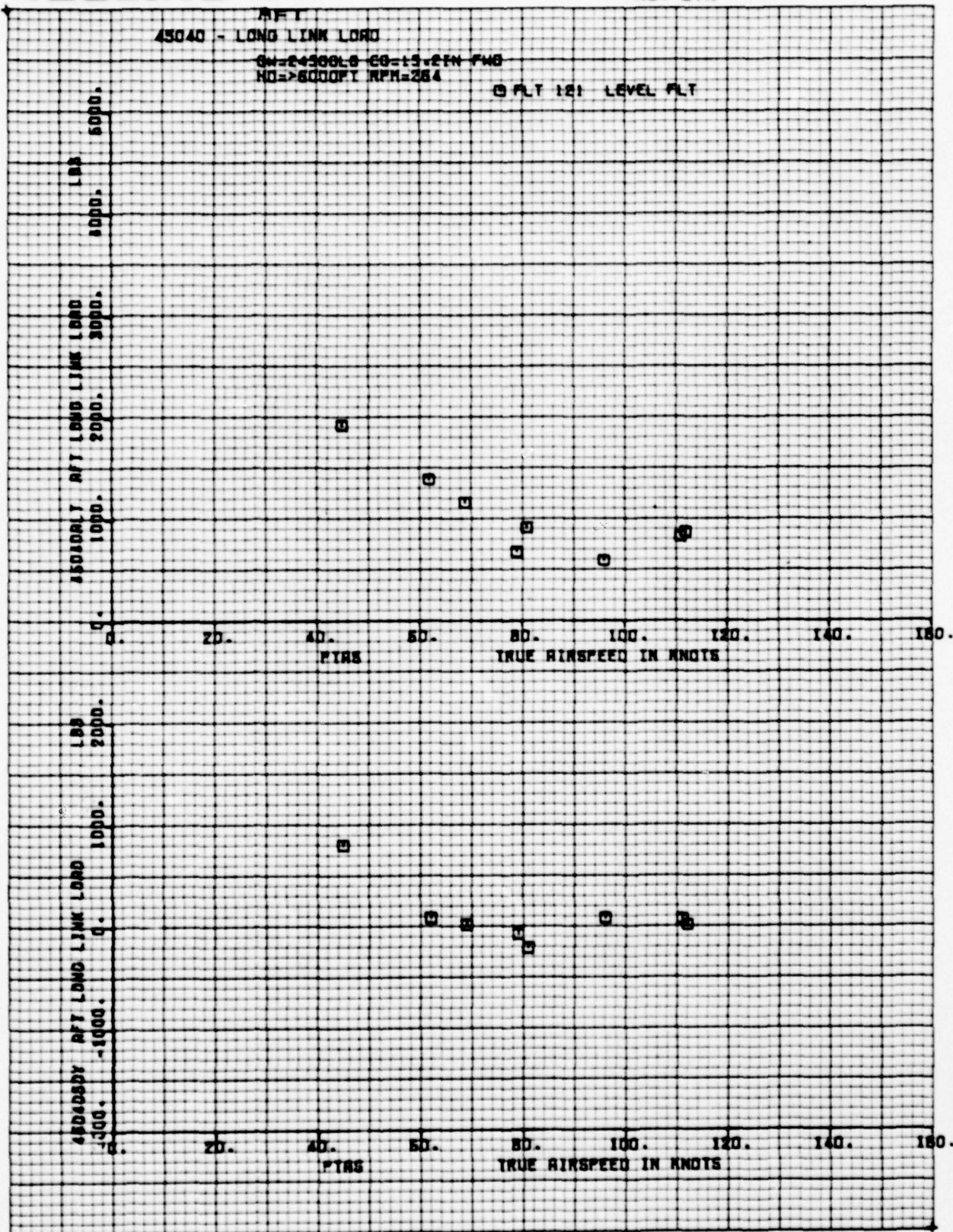
THE **BOEING** COMPANY



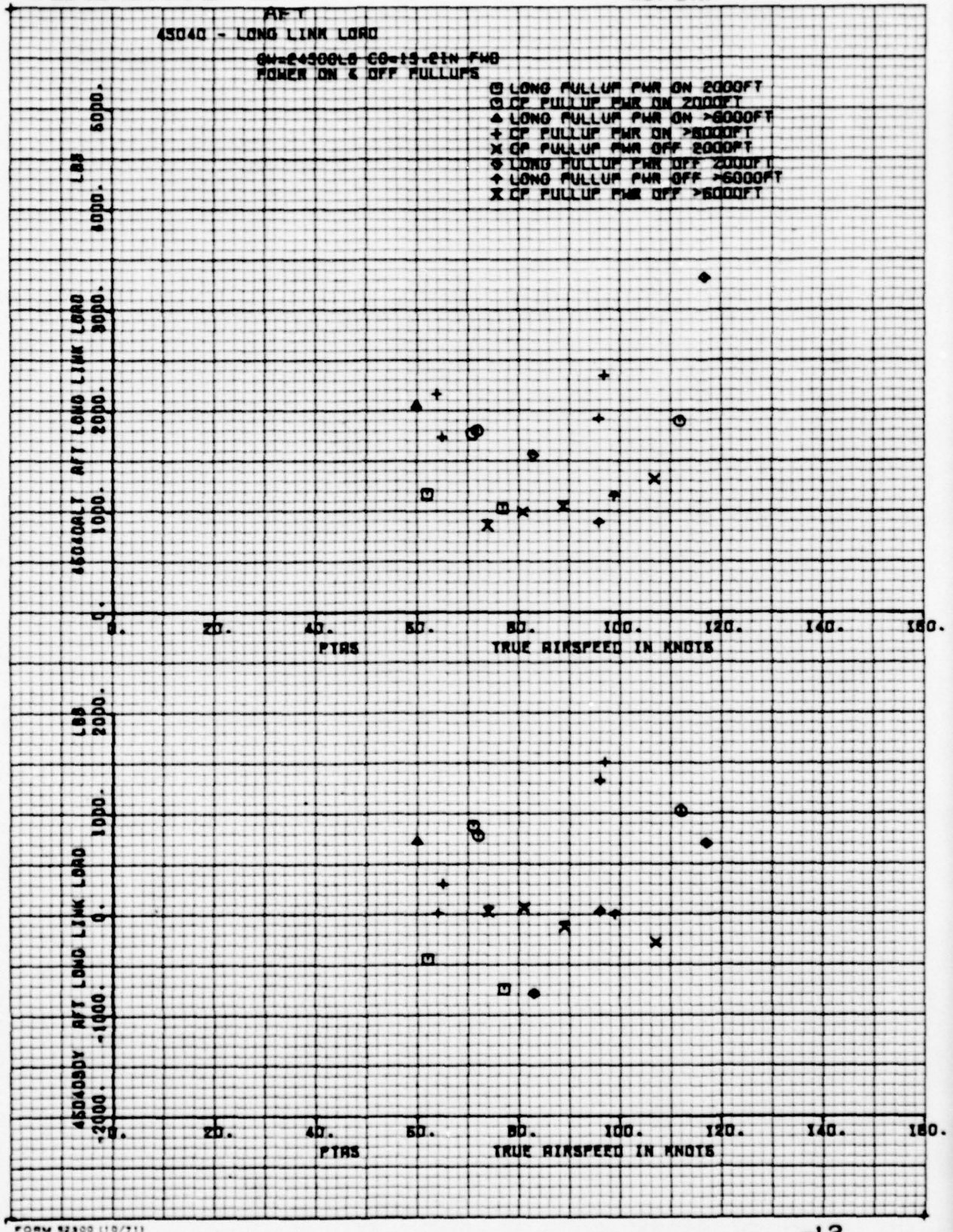
FORM 82300 (10/71)

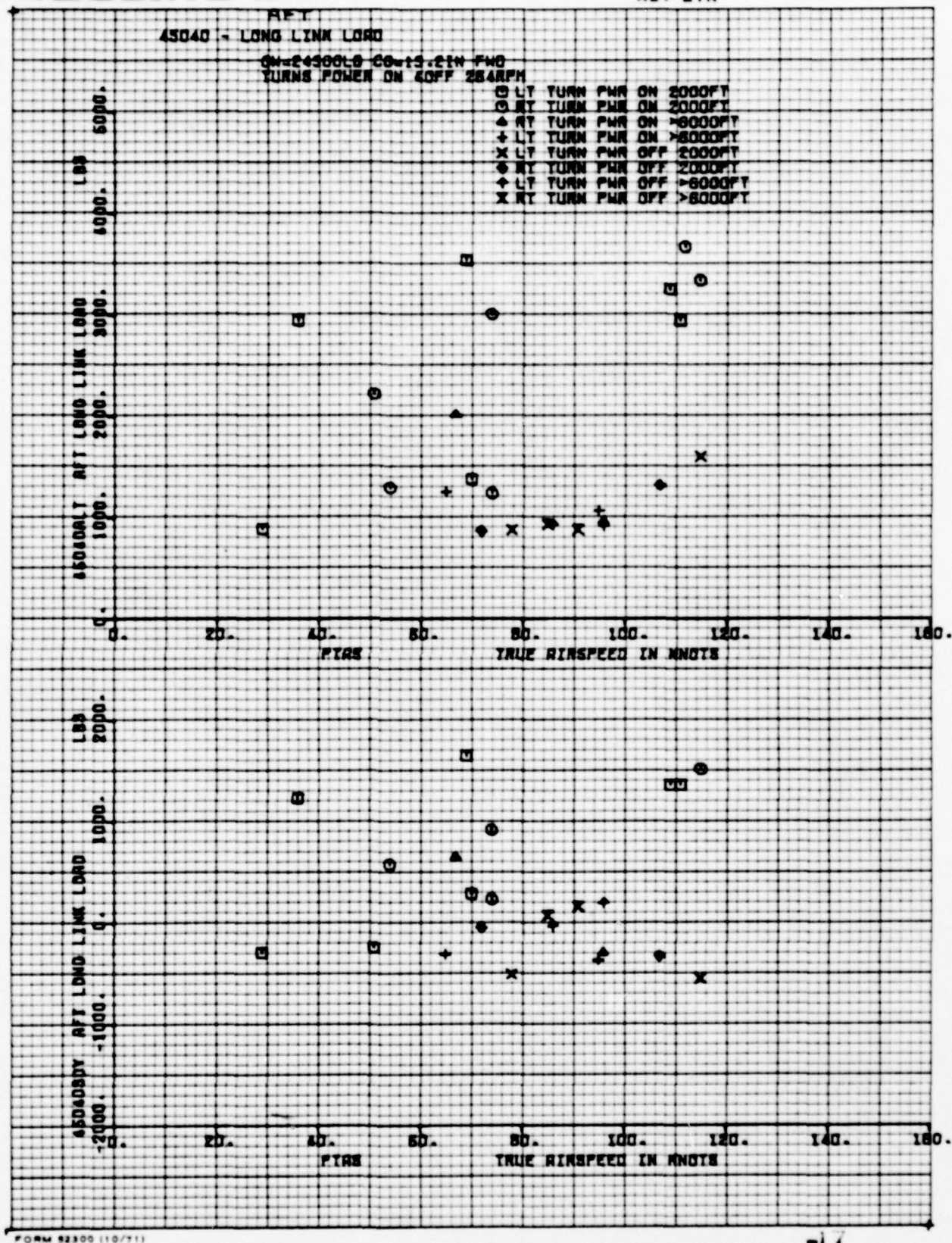
THE **BOEING** COMPANY

FORM 52300 (10/71)

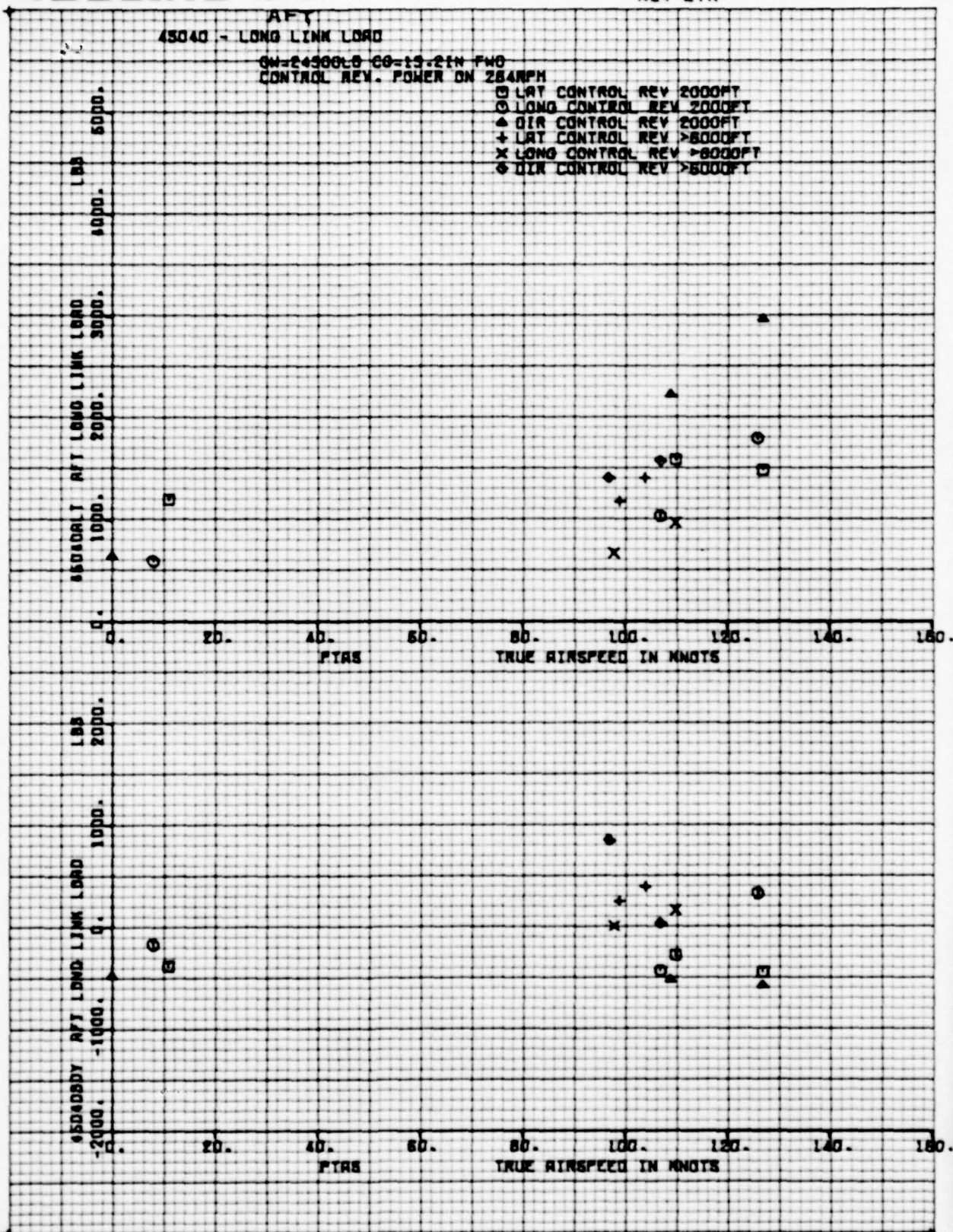
THE **BOEING** COMPANY

FORM 52300 (10/71)



THE **BOEING** COMPANY

FORM 52300 (10/71)



REV LTR

45040 - LONG LINK LOAD

QW-24800LB G0-19.2IN FWD 264RPM

□ FLARE
○ SPIRAL DESCENT

45040DLT AFT LONG LINK LOAD

45040SDY AFT LONG LINK LOAD

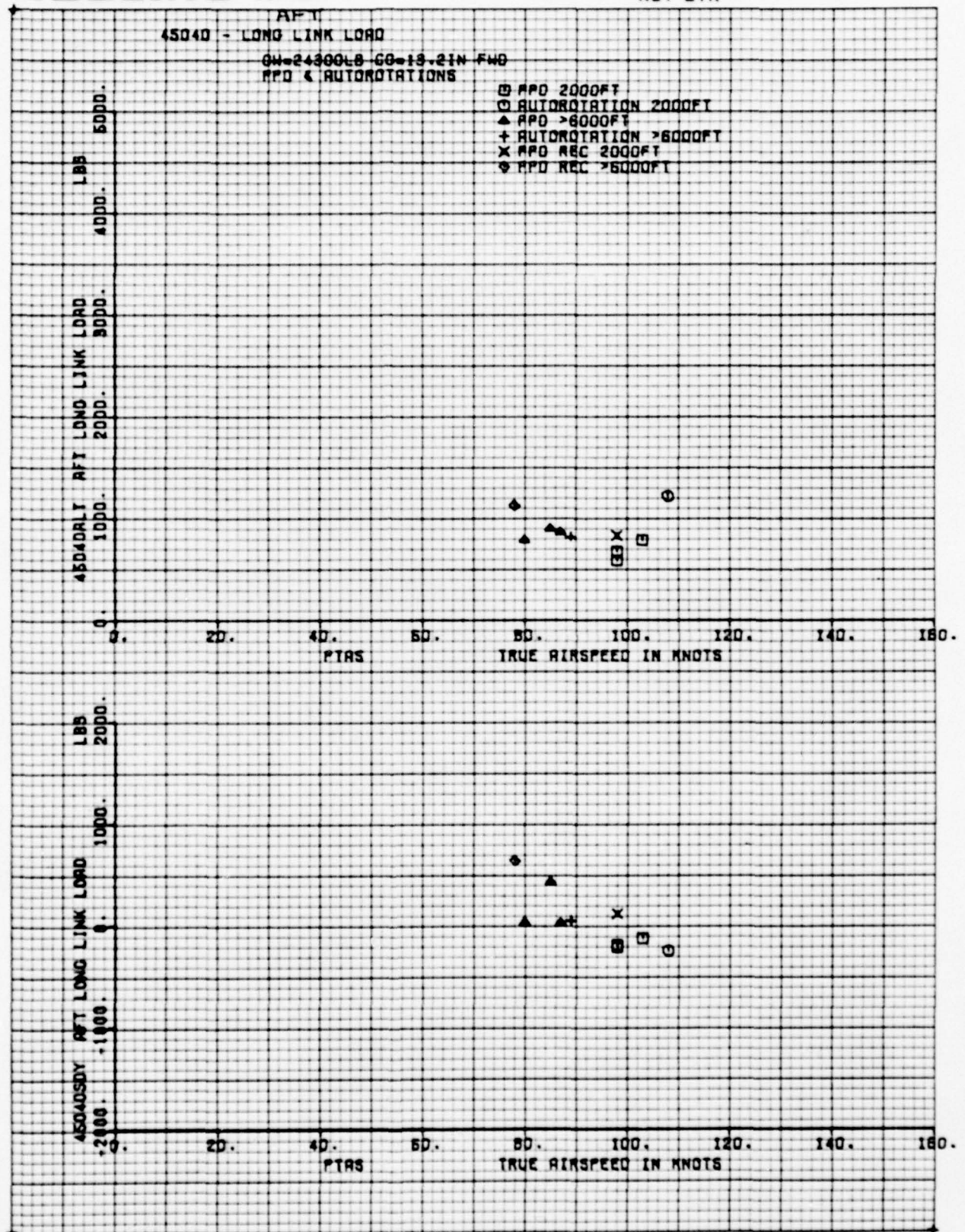
PTAS

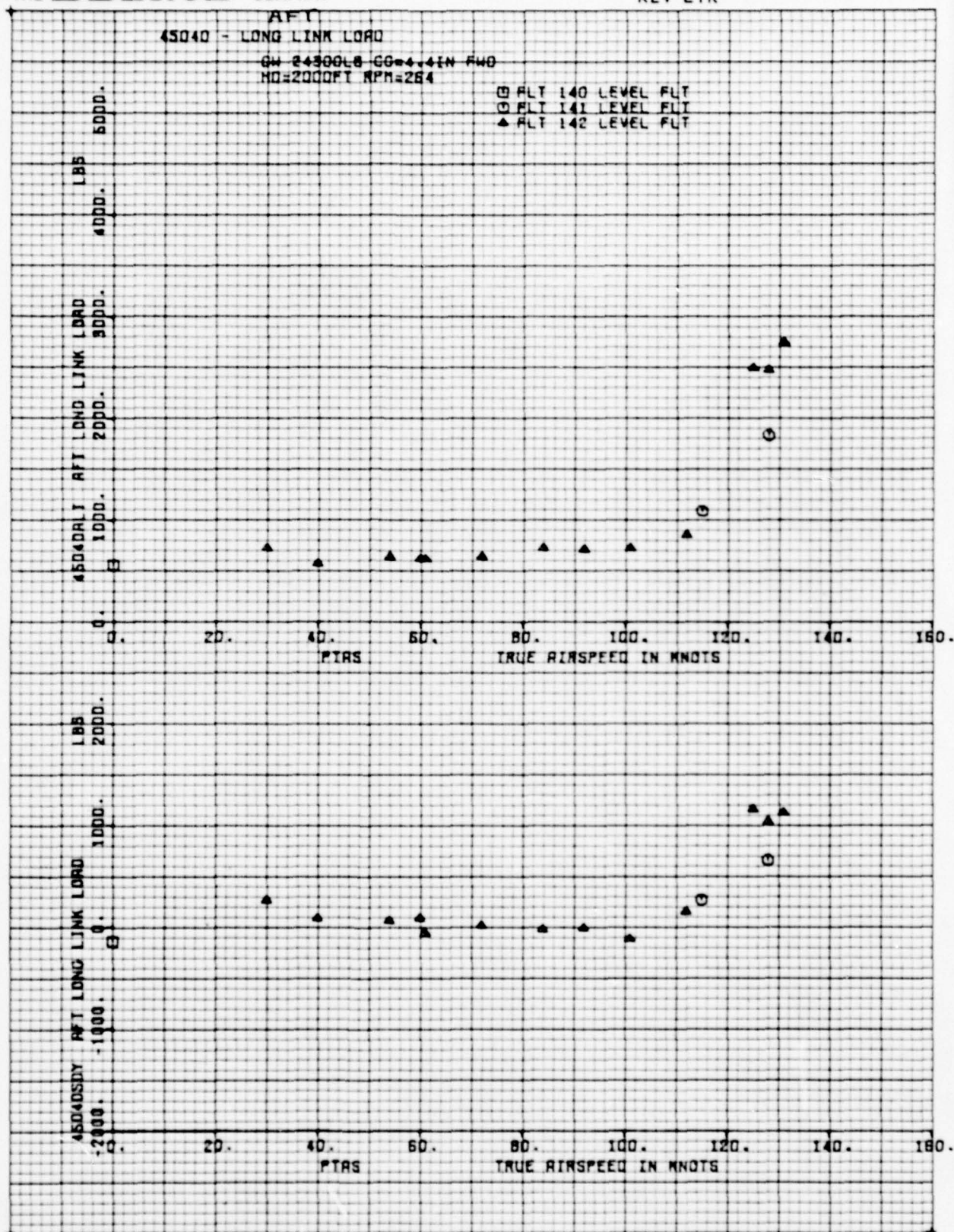
TRUE AIRSPEED IN KNOTS

PTAS

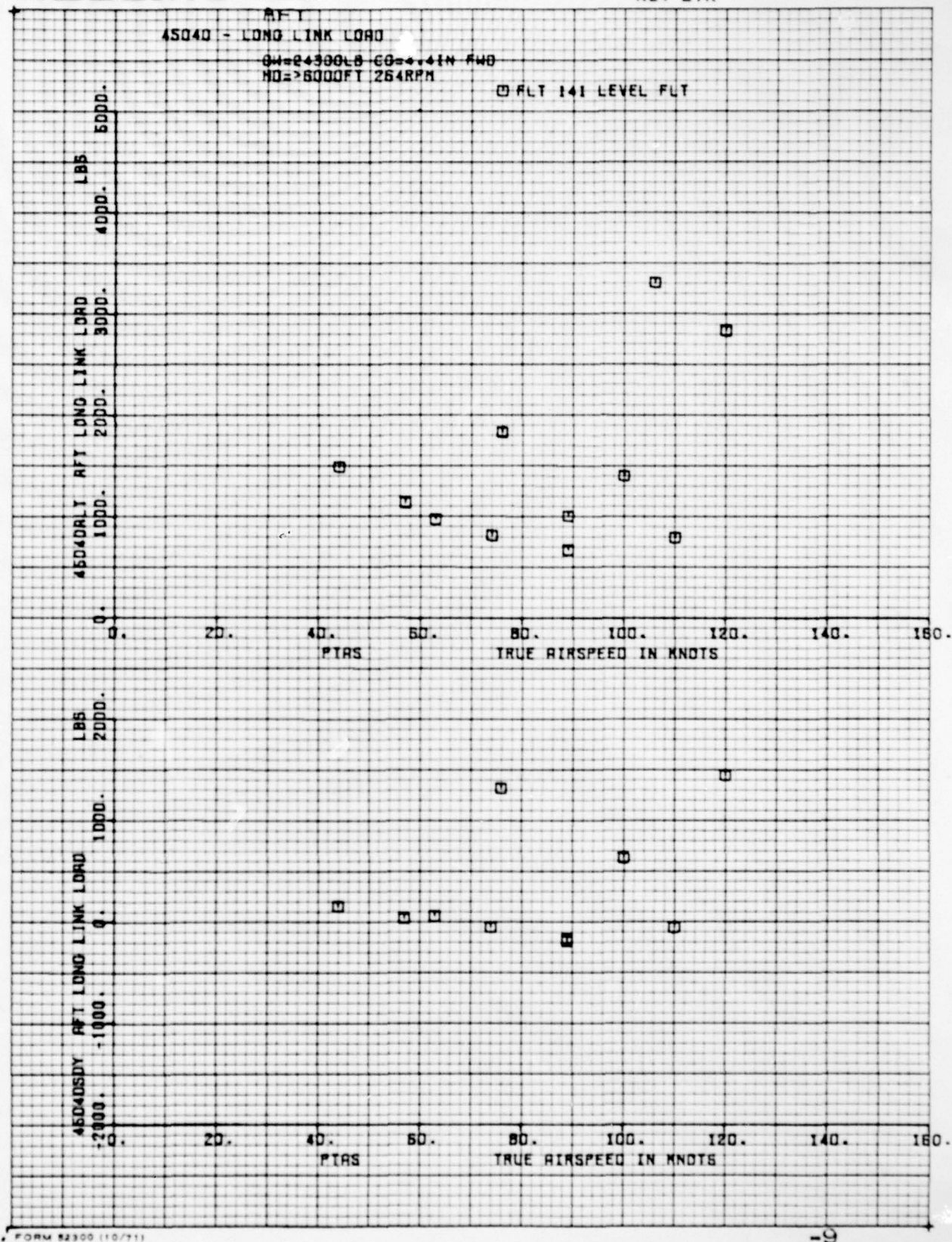
TRUE AIRSPEED IN KNOTS

FORM 52300 (10/71)

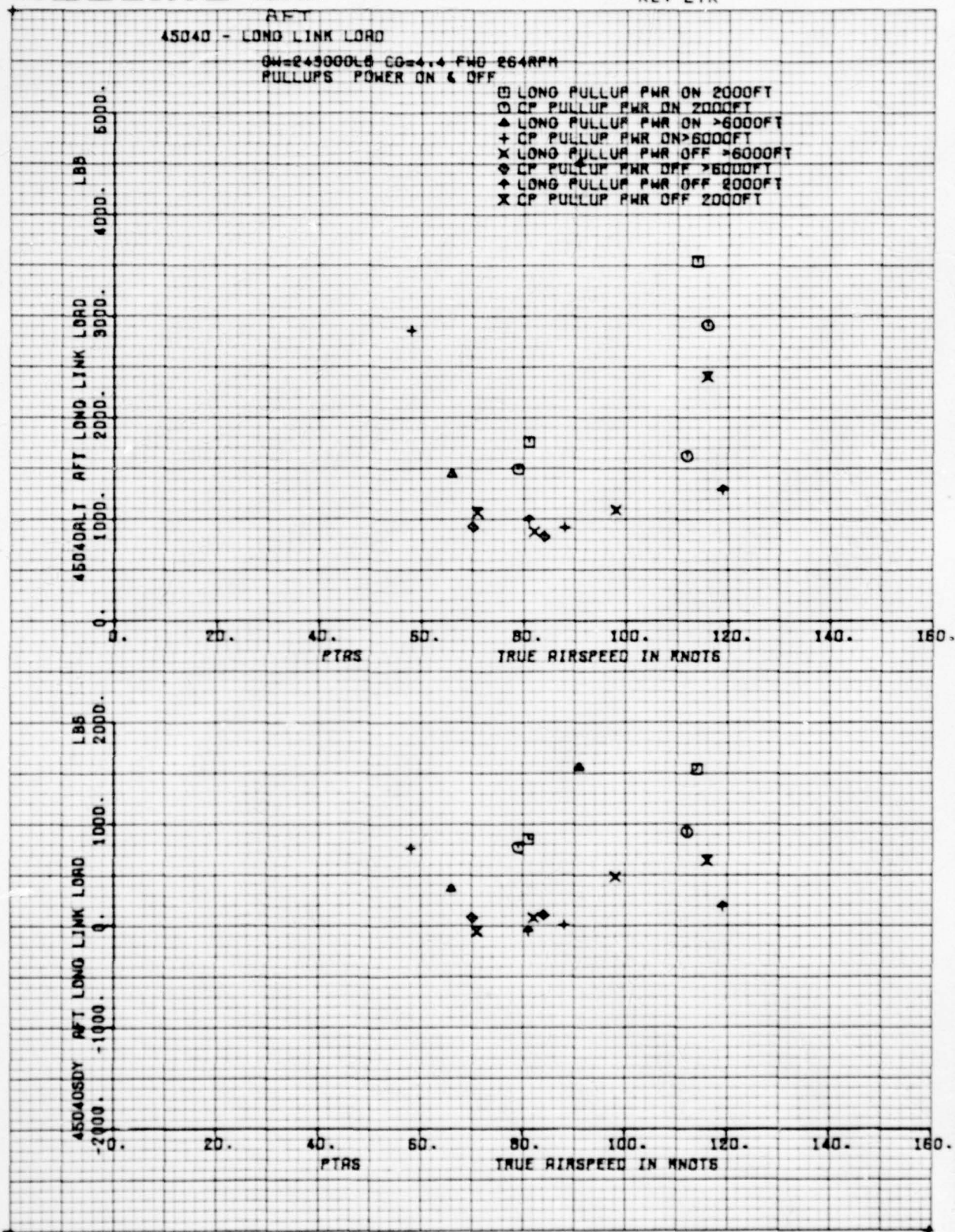


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FORM 52300 (10/71)

THE **BOEING** COMPANY

FORM 82300 (10/71)



45040 - LONG LINK LOAD

REF
GW=24900LB CO=4.4 FWD
POWER ON & OFF TURNS 264RPM

45040DLT AFT LONG LINK LOAD LBS
0 1000 2000 3000 4000 5000

45040SDY AFT LONG LINK LOAD LBS
-2000 -1000 0 1000 2000

PTAS 20 40 60 80 100 120 140 160

TRUE AIRSPEED IN KNOTS

45040DLT AFT LONG LINK LOAD LBS
0 1000 2000 3000 4000 5000

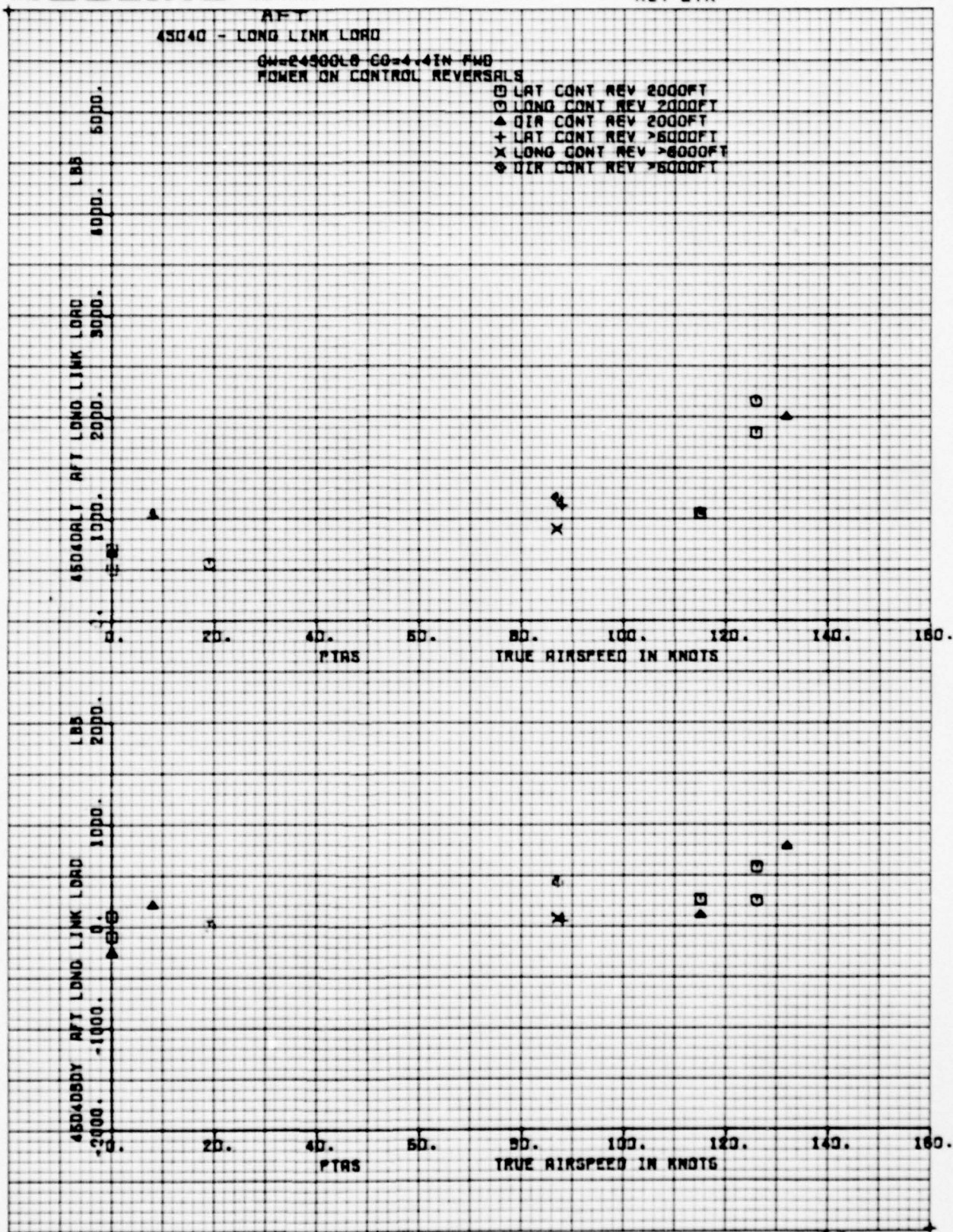
45040SDY AFT LONG LINK LOAD LBS
-2000 -1000 0 1000 2000

PTAS 20 40 60 80 100 120 140 160

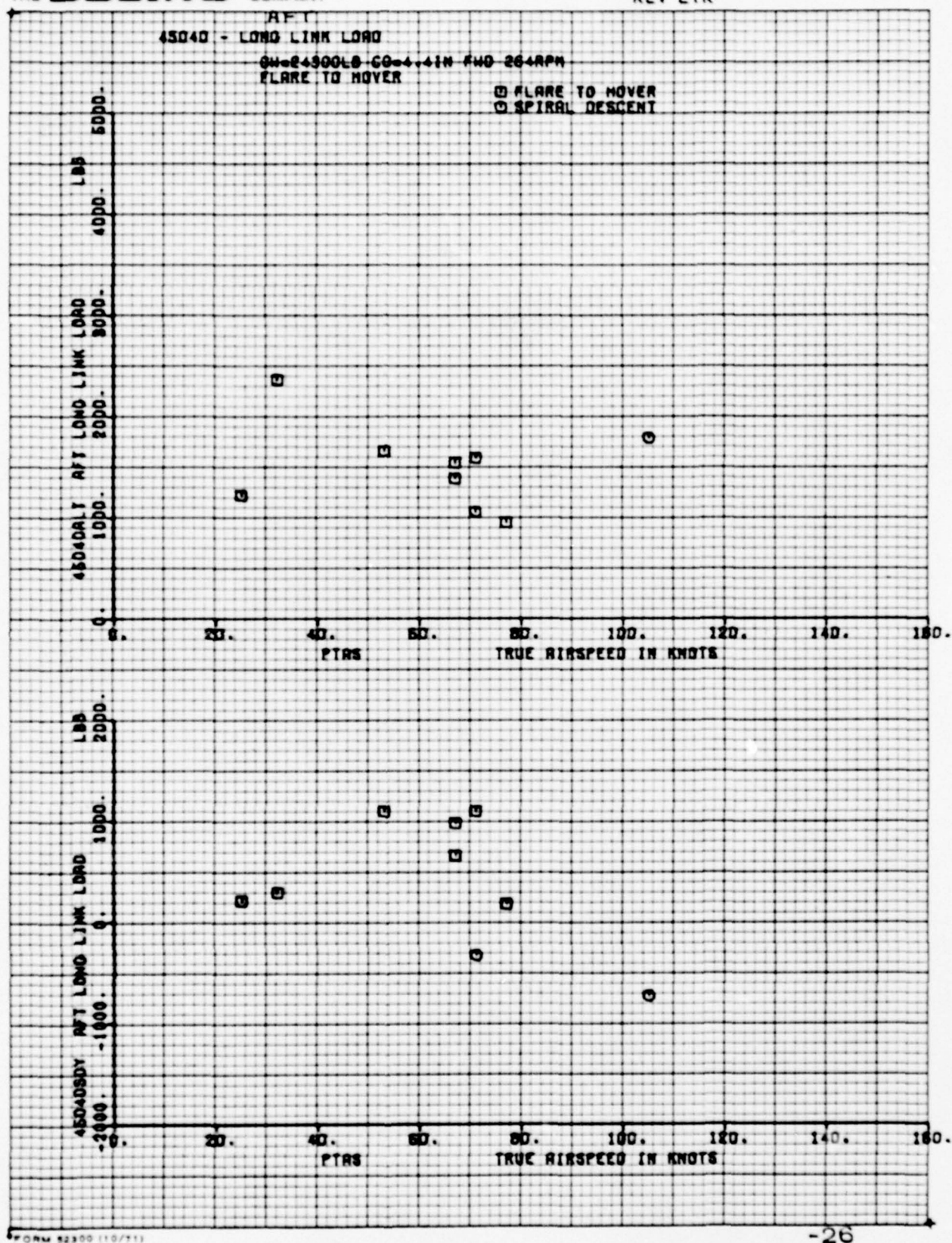
TRUE AIRSPEED IN KNOTS

Legend:

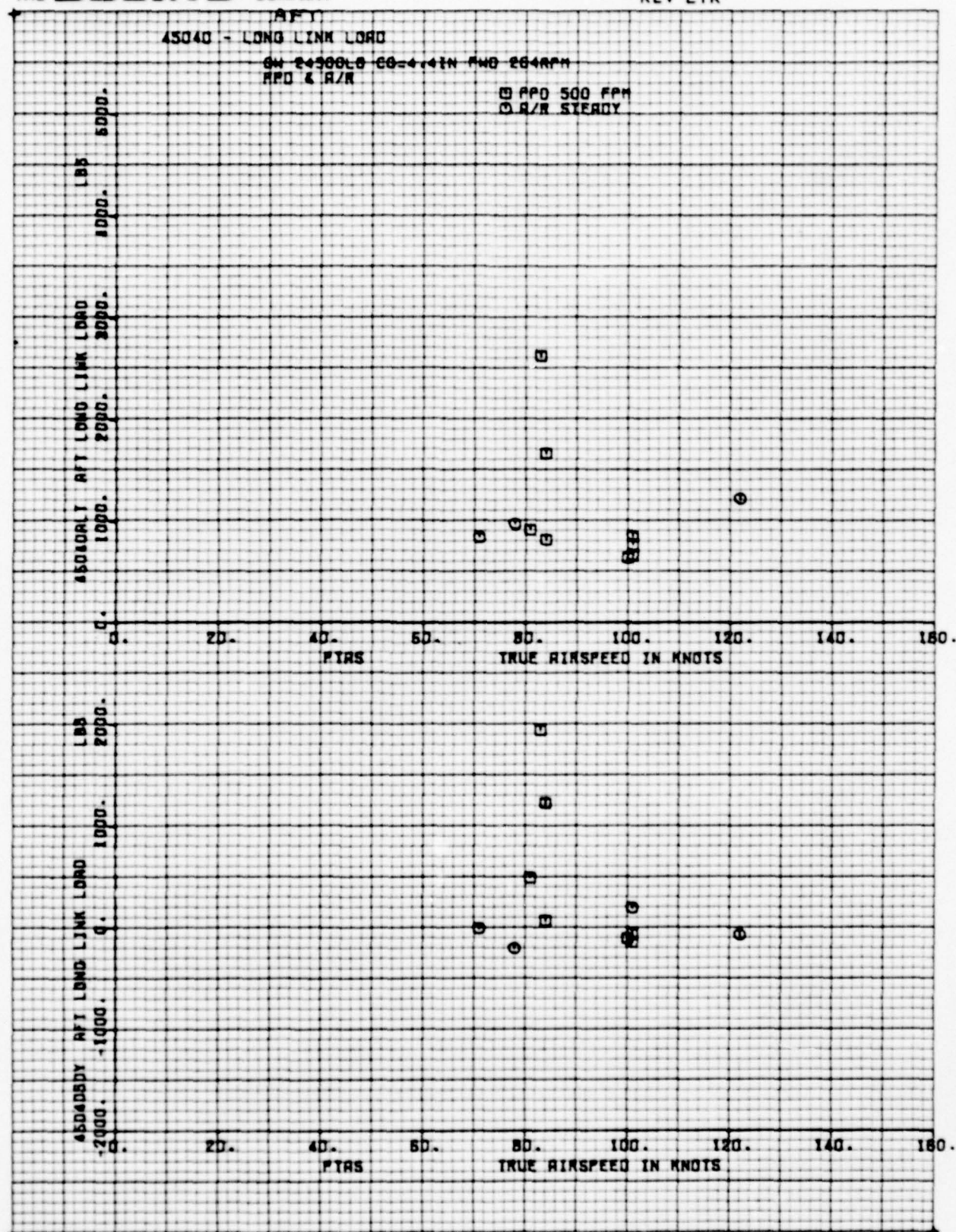
- LT TURN PWR ON 2000FT
- RT TURN PWR ON 2000FT
- △ LT TURN PWR ON >6000FT
- + RT TURN PWR ON >6000FT
- x LT TURN PWR OFF 2000FT
- RT TURN PWR OFF 2000FT
- ◇ RT TURN PWR OFF >6000FT
- x LT TURN PWR OFF >6000FT

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FORM 52300 (10/71)

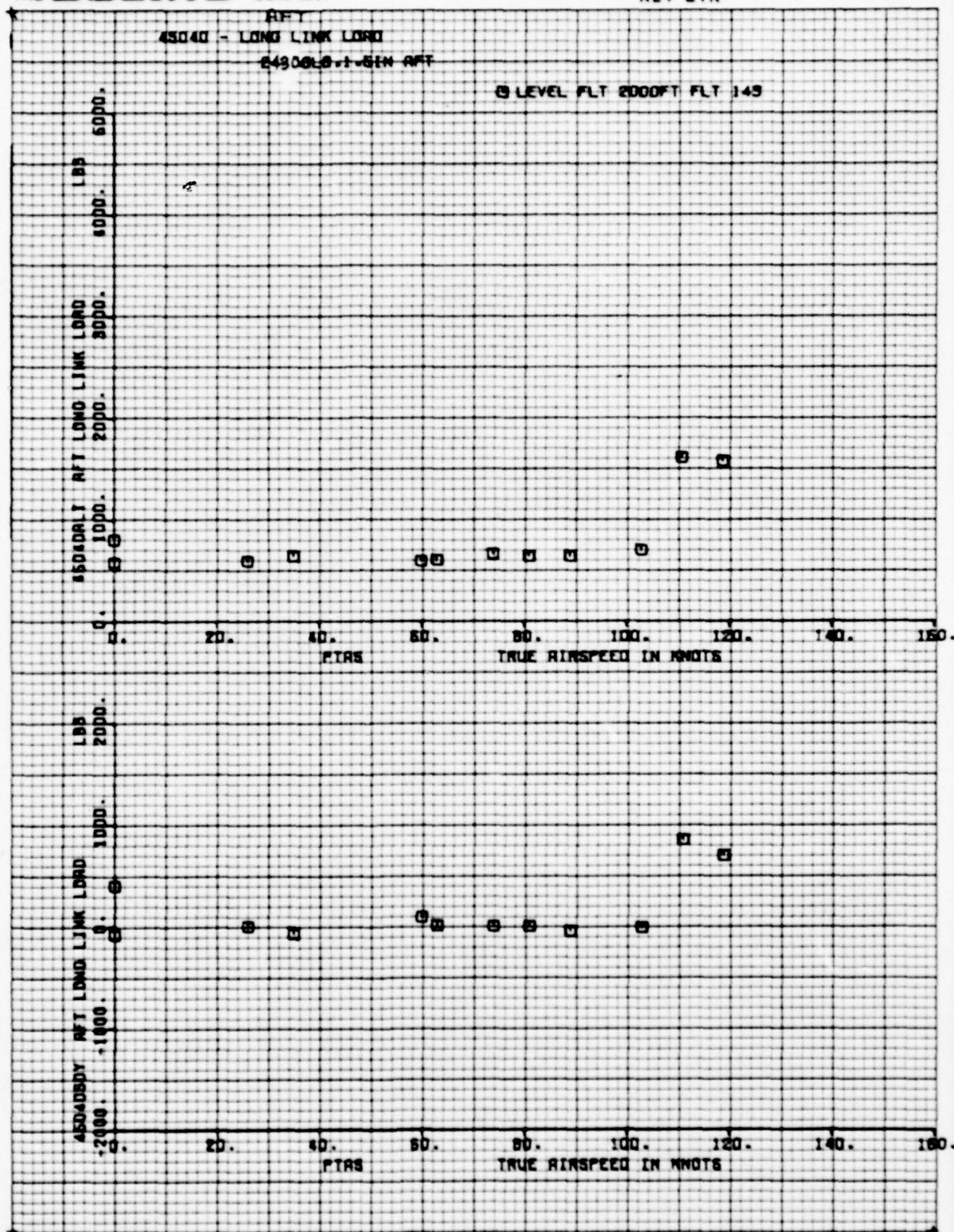


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FORM 52300 (10/71)

THE **BOEING** COMPANY



FORM 52300 (10/71)

THE **BOEING** COMPANY

PREPARED BY: J. Bendo

CHECKED BY:

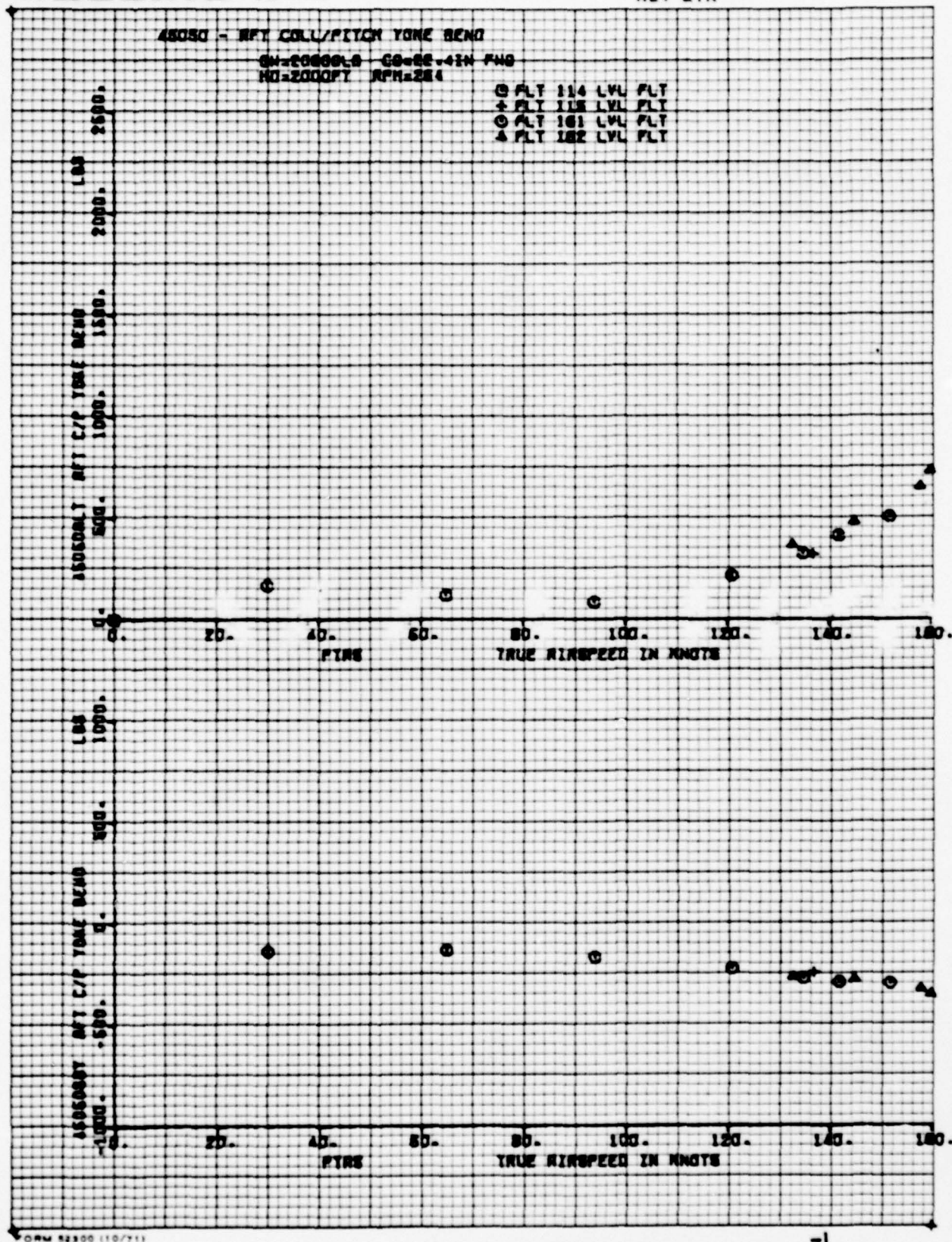
DATE: 8/28/78

NUMBER D210-11168-3

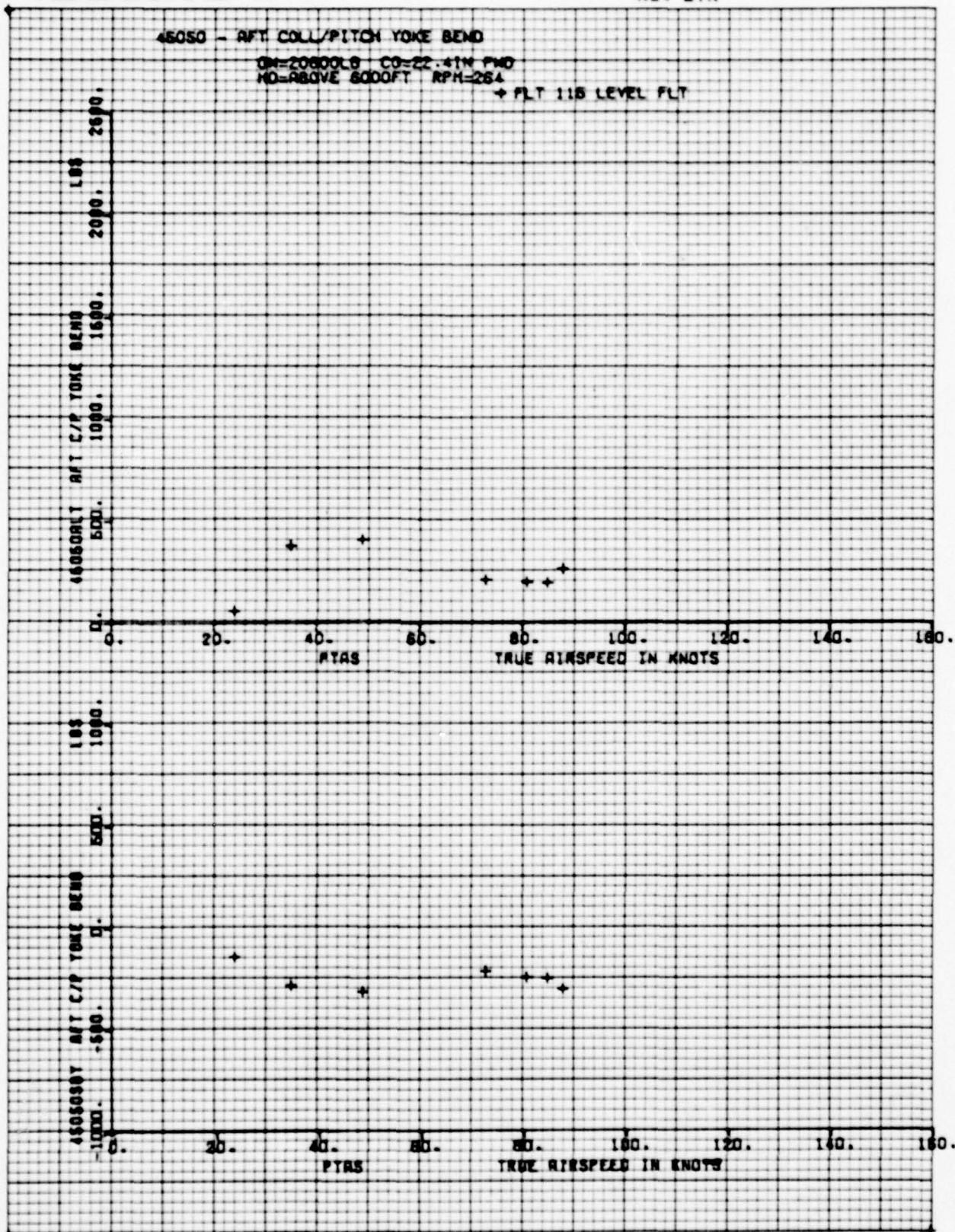
REV LTR Volume 7

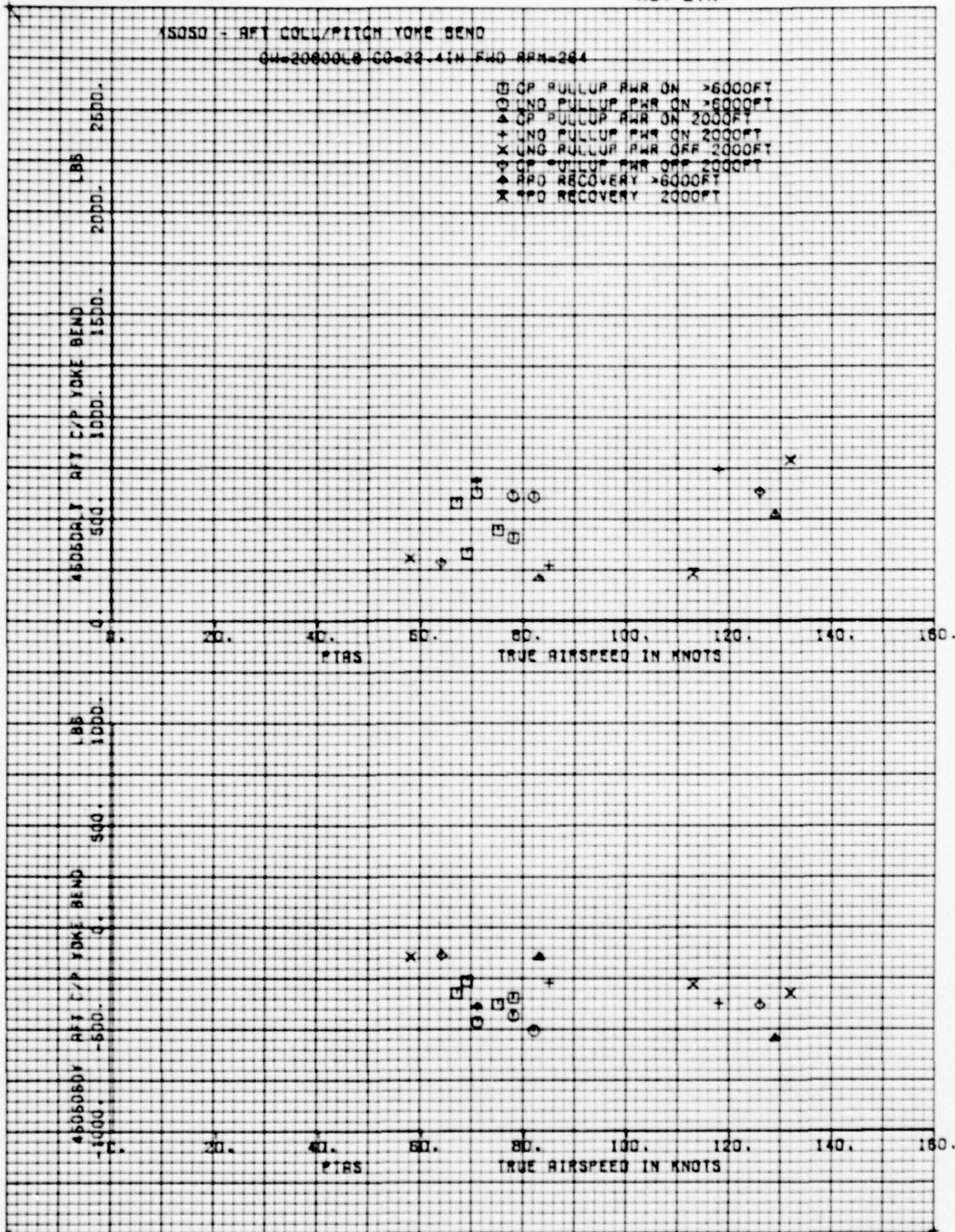
MODEL NO.

4.10 Aft Collective/Pitch Yoke

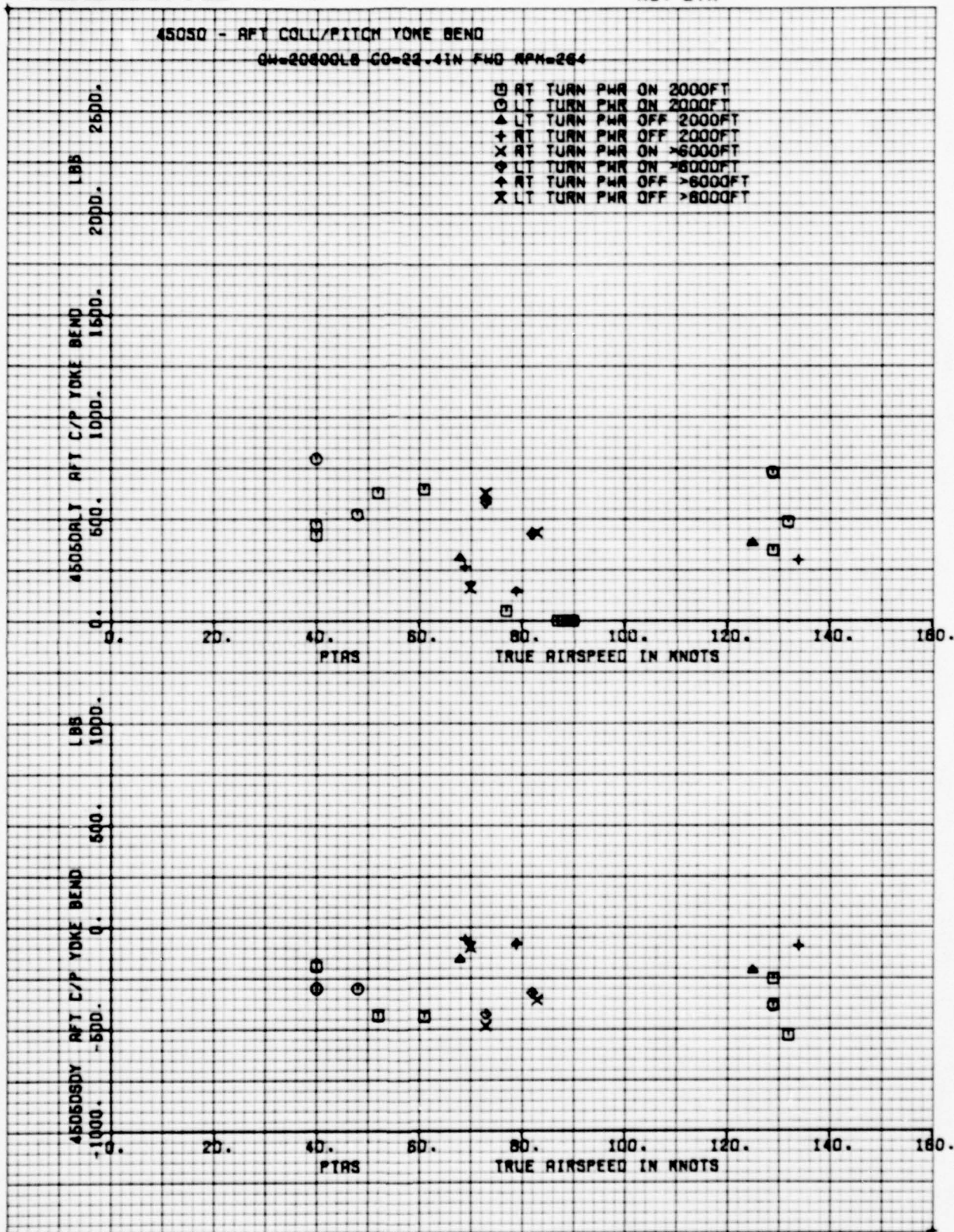


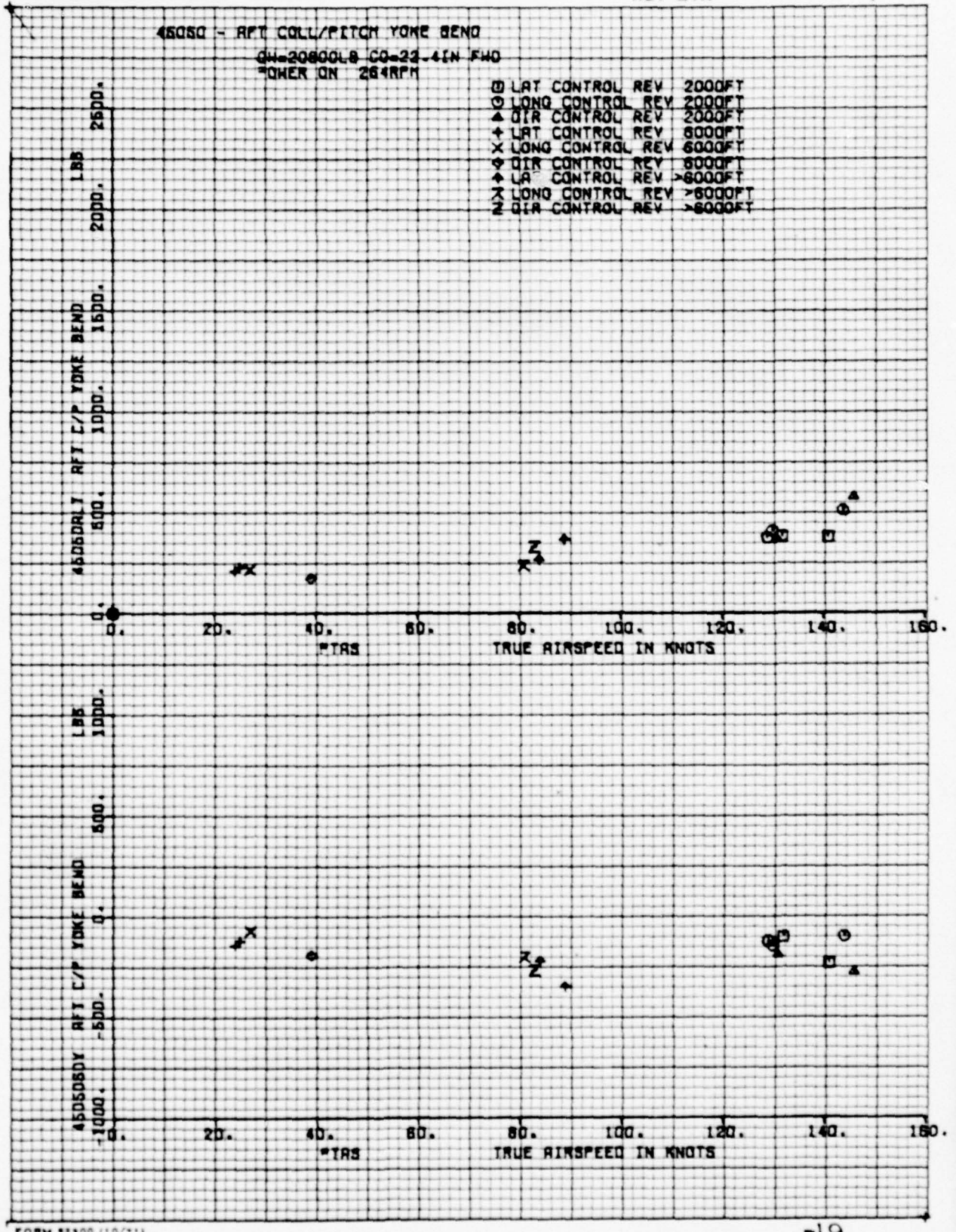
FORM 52300 (10/71)

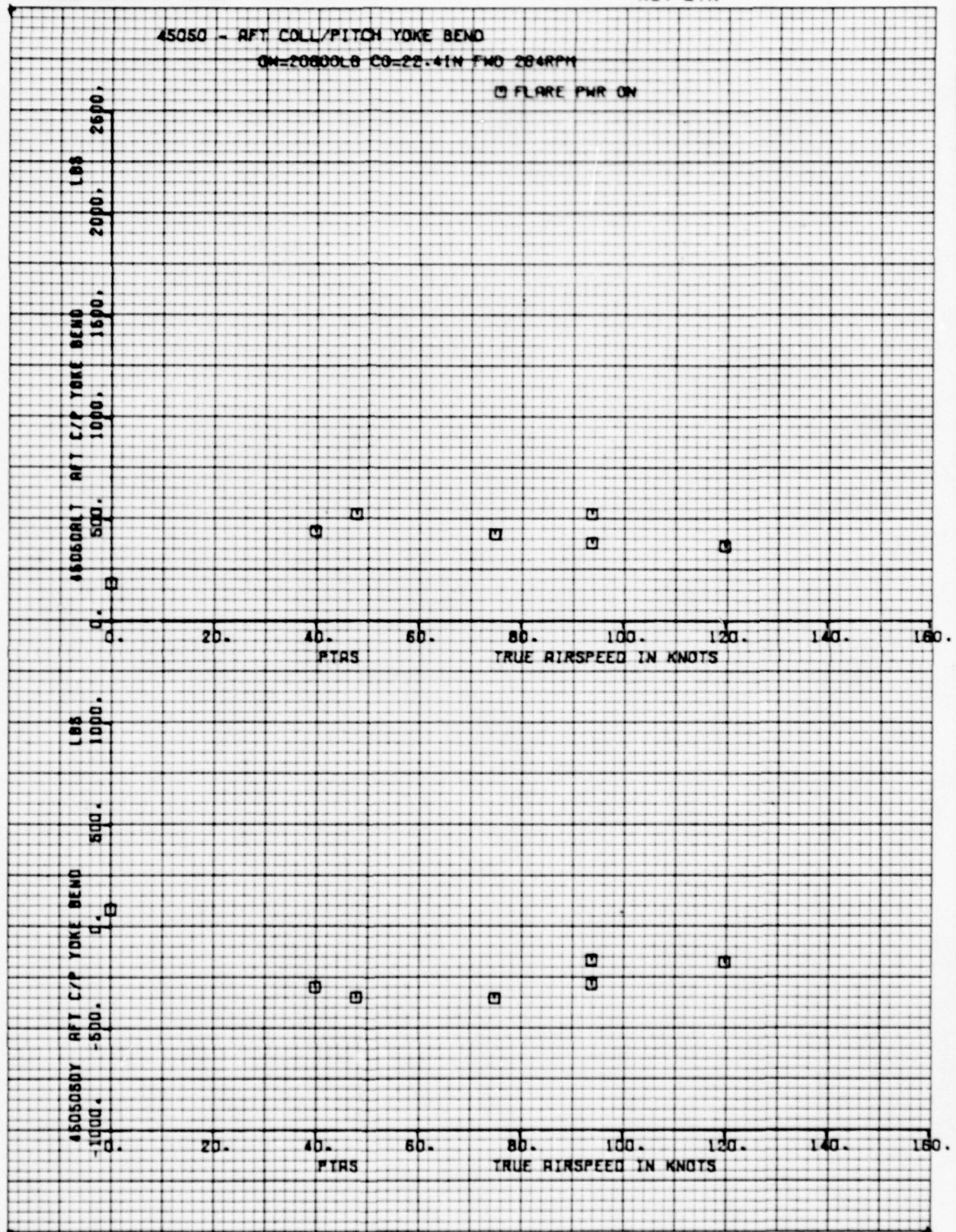




FORM 52300 (10/71)



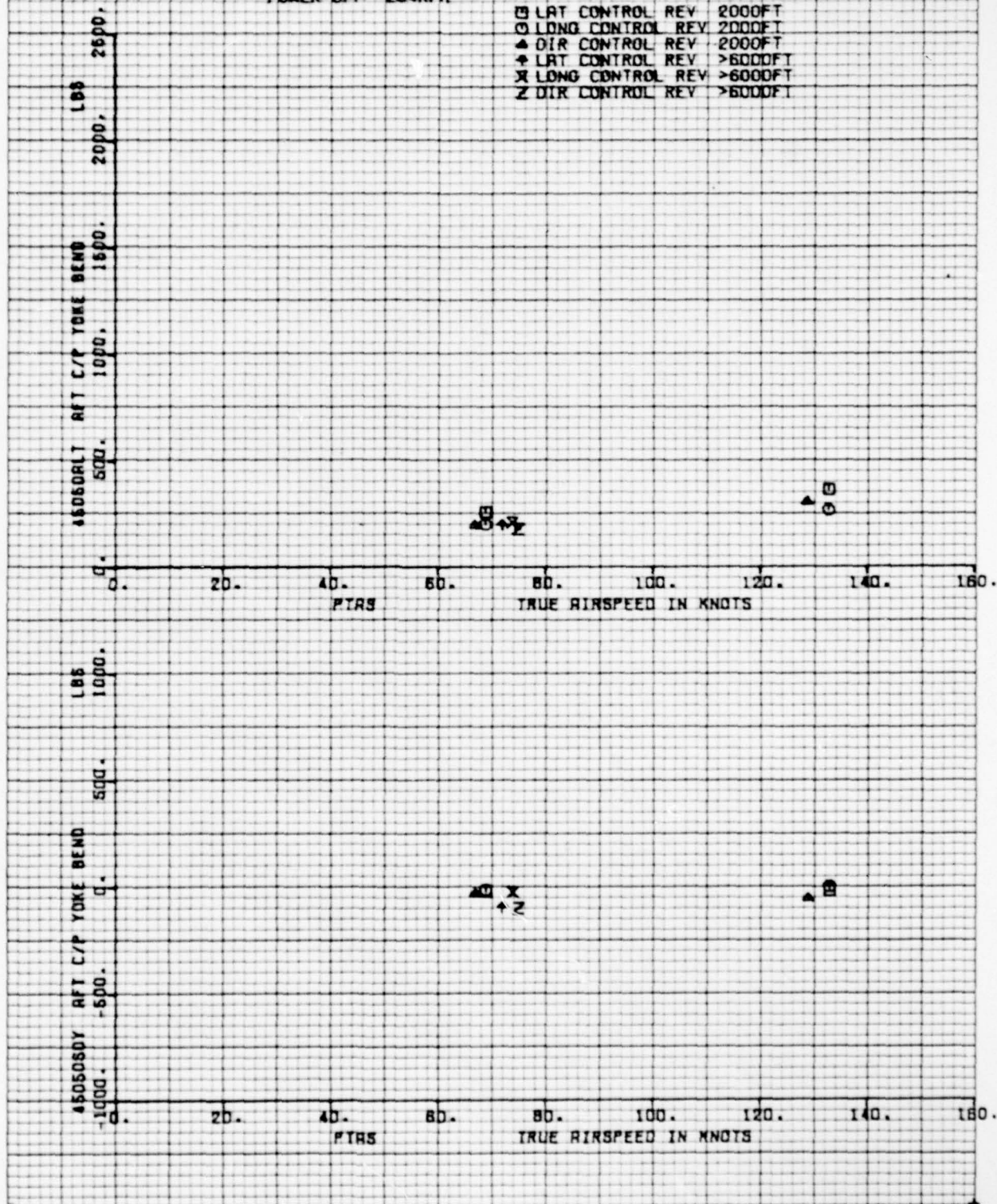


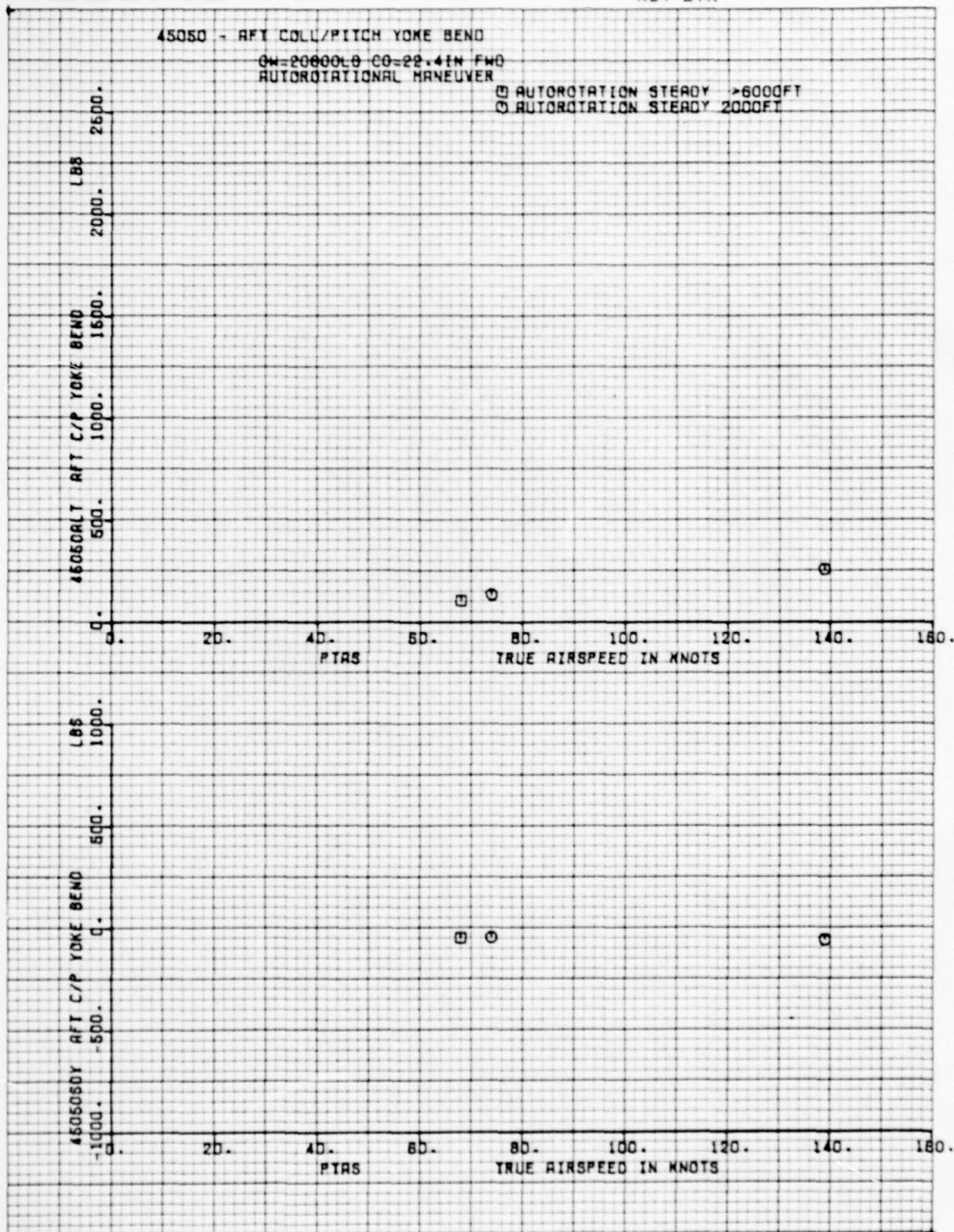


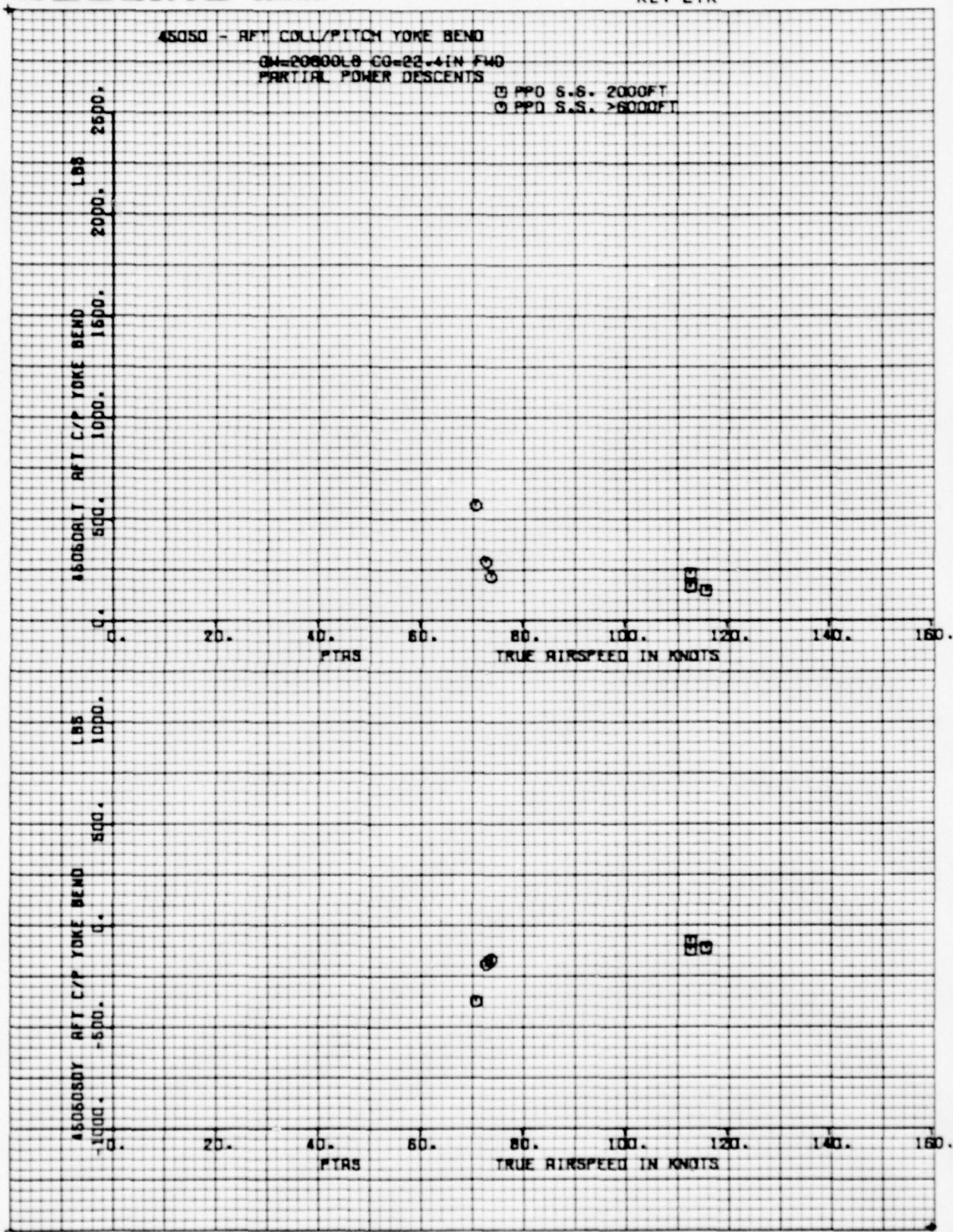
45050 - RFT COLL/PITCH YOKE BEND

OM-20800LB CO-22.4IN FWD
POWER OFF 264RPM

□ LAT CONTROL REV 2000FT
○ LONG CONTROL REV 2000FT
▲ DIR CONTROL REV 2000FT
+ LAT CONTROL REV >6000FT
X LONG CONTROL REV >6000FT
Z DIR CONTROL REV >6000FT





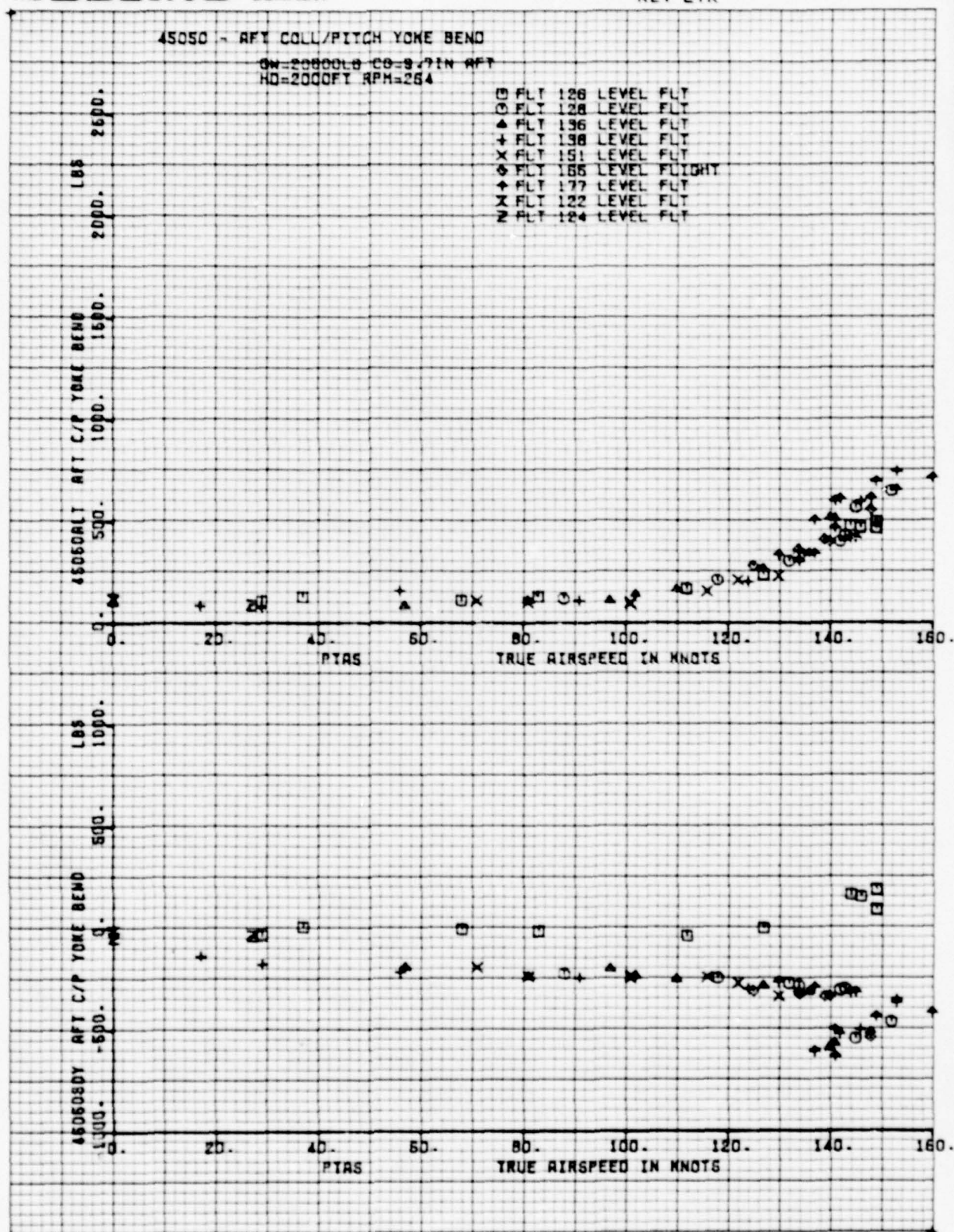


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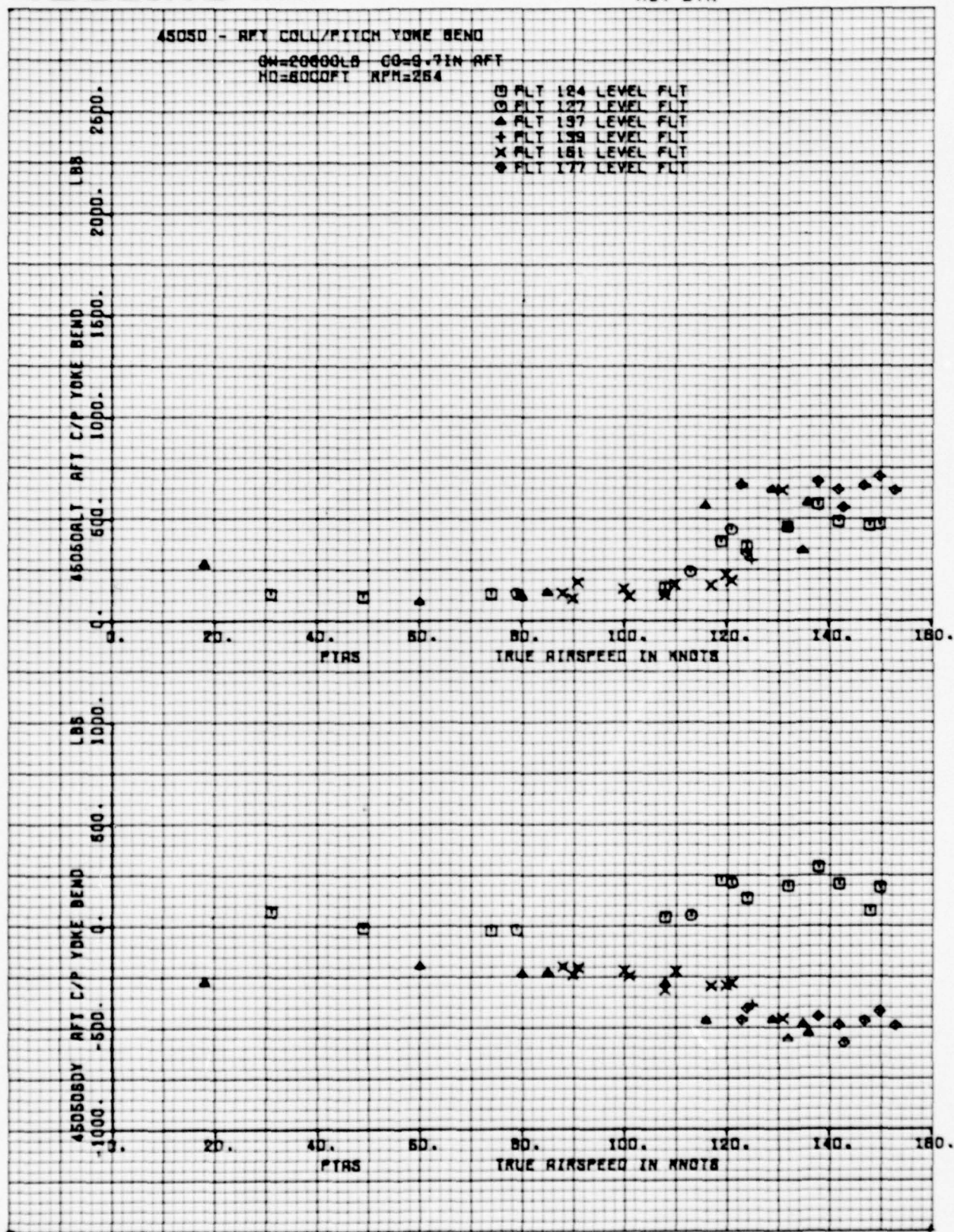
45050 - AFT COLL/PITCH YOKES BEND

GW=20800LB CG=9.7IN AFT
HD=2000FT RPM=264

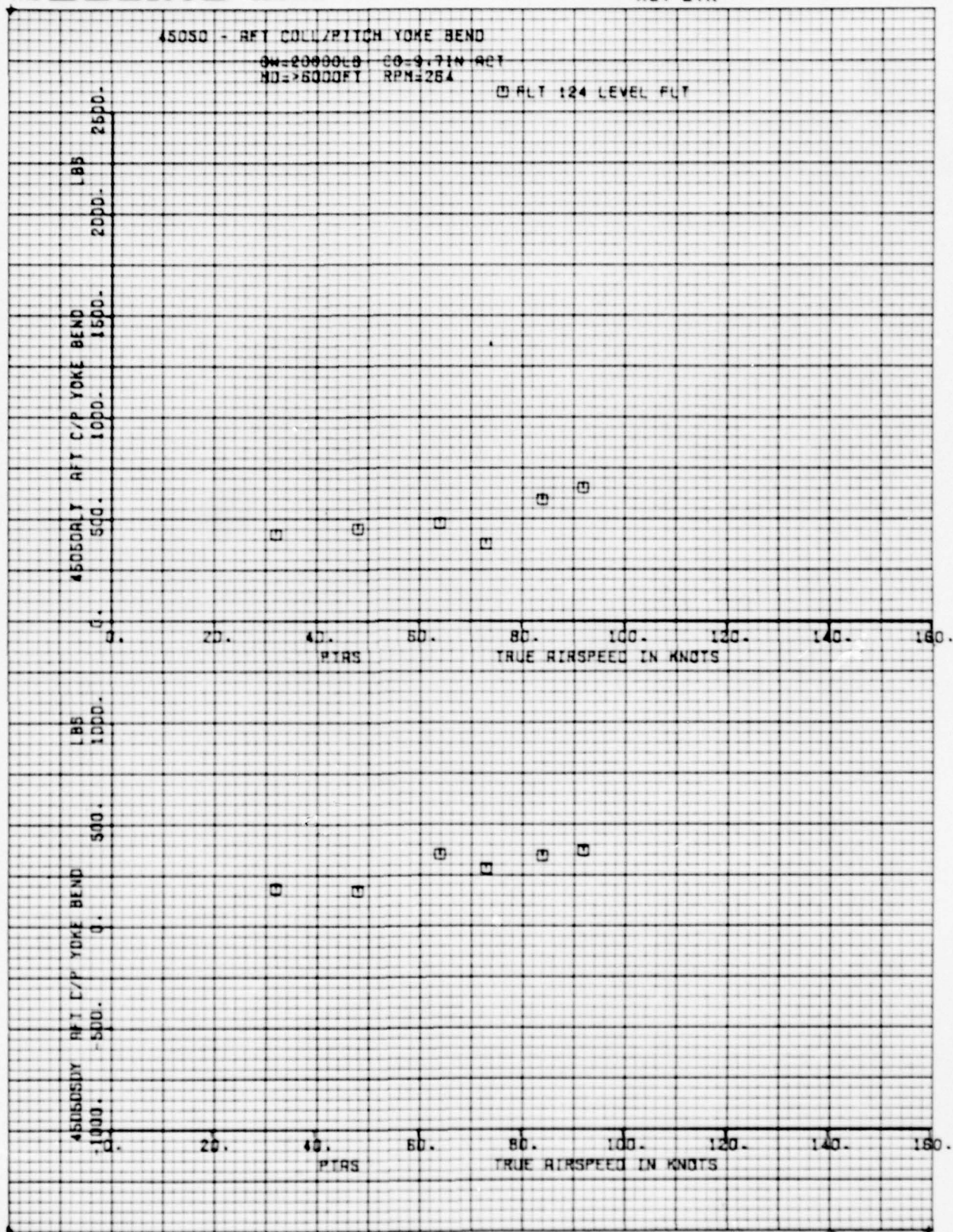
□ FLT 128 LEVEL FLT
 ○ FLT 128 LEVEL FLT
 ▲ FLT 136 LEVEL FLT
 + FLT 138 LEVEL FLT
 × FLT 151 LEVEL FLT
 ◇ FLT 165 LEVEL FLIGHT
 + FLT 177 LEVEL FLT
 × FLT 122 LEVEL FLT
 Z FLT 124 LEVEL FLT



FORM 52300 (10/71)



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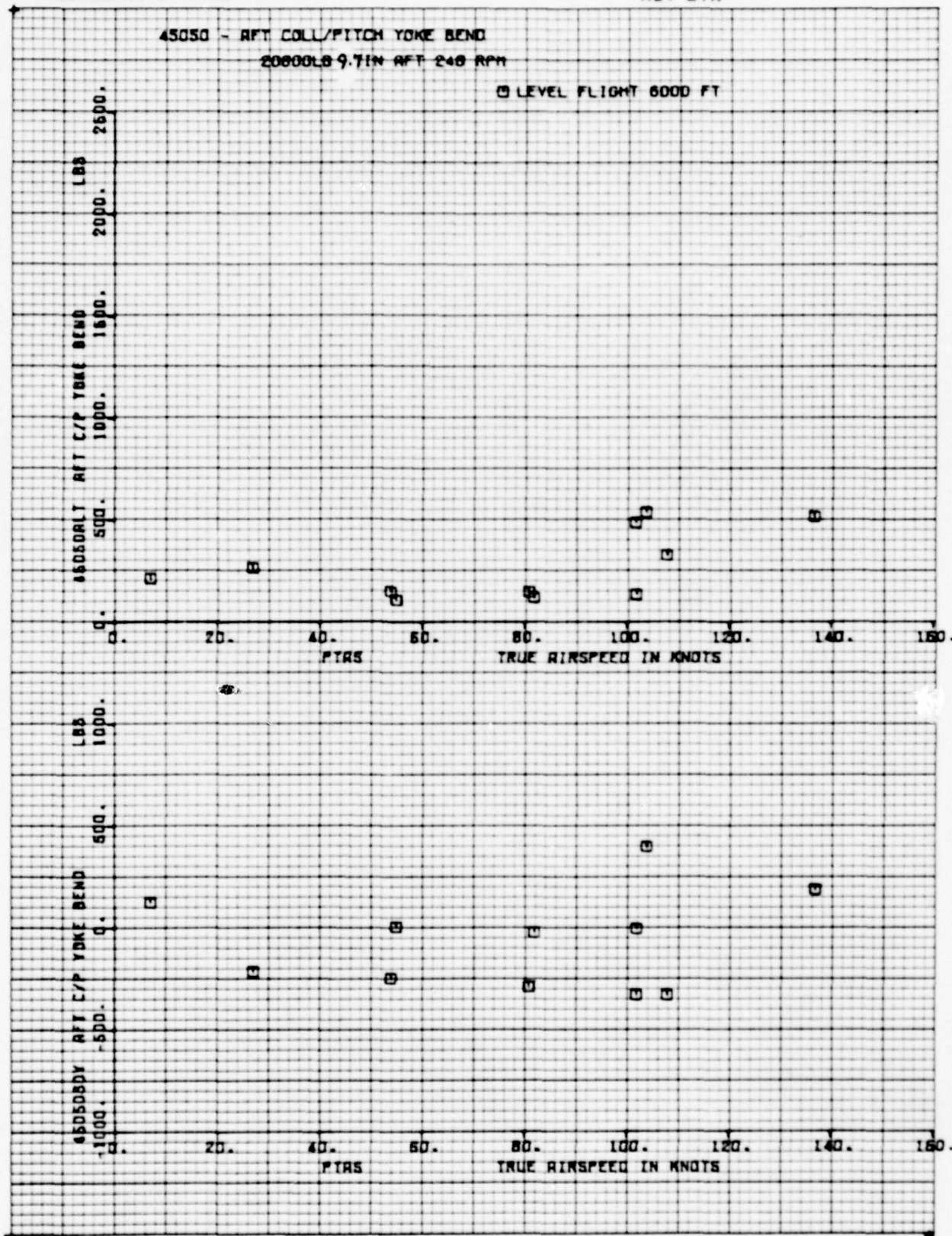
FORM 52300 (10/71)

THE **BOEING** COMPANY

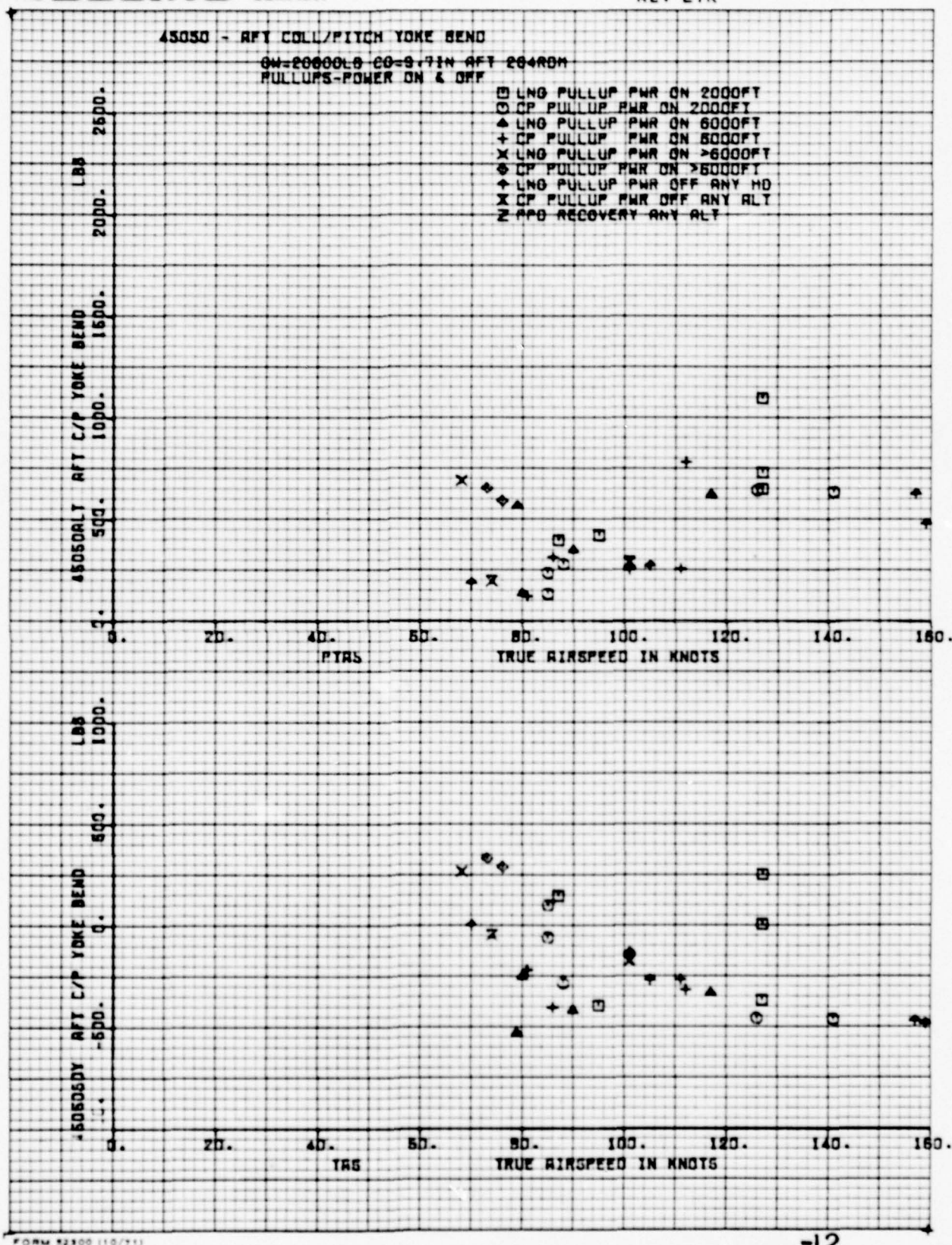
45050 - AFT COLL/PITCH YOKE BEND

20000LB 9.7IN AFT 240 RPM

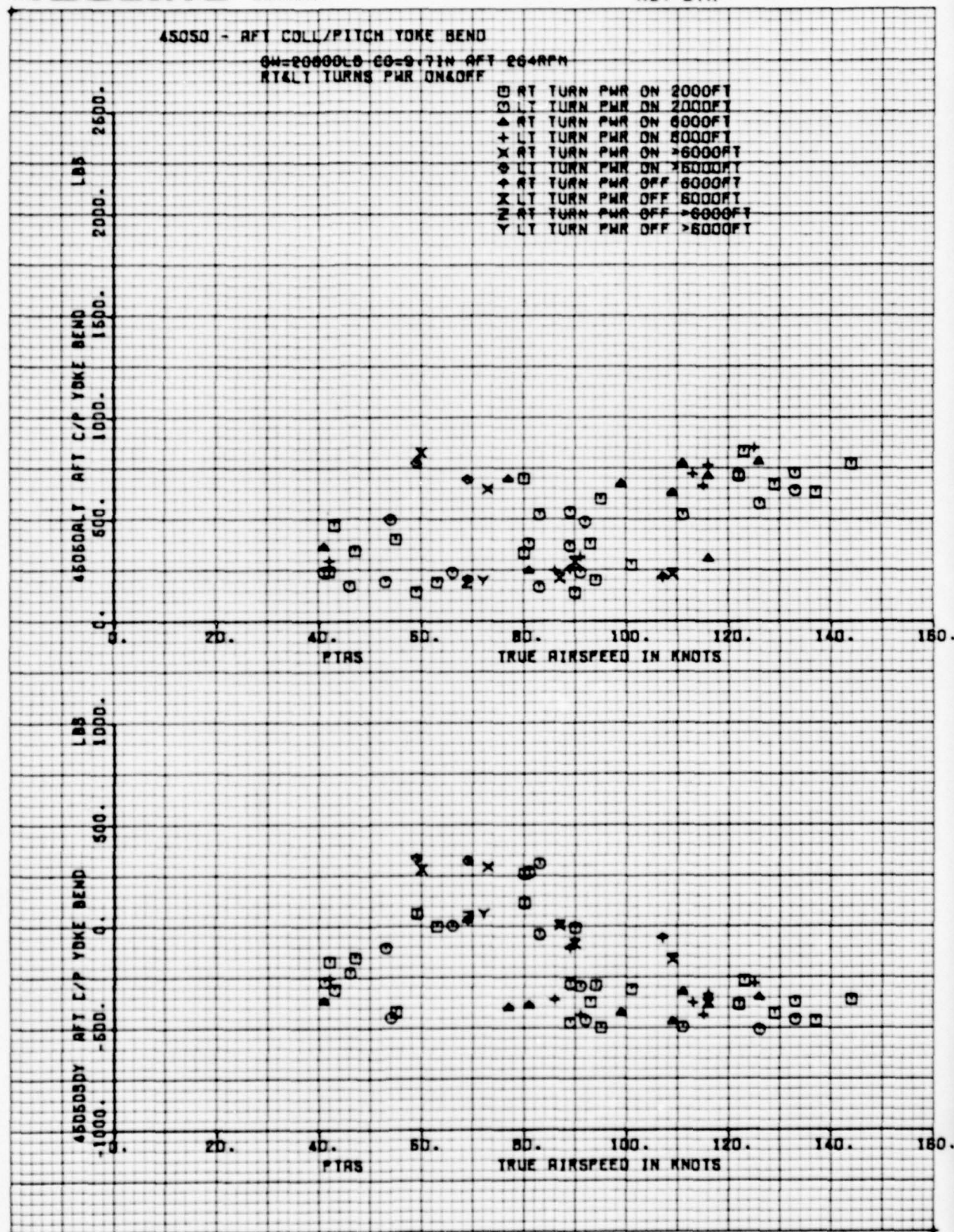
□ LEVEL FLIGHT 6000 FT



FORM 82300 (10/71)



FORM 52300 (10/71)

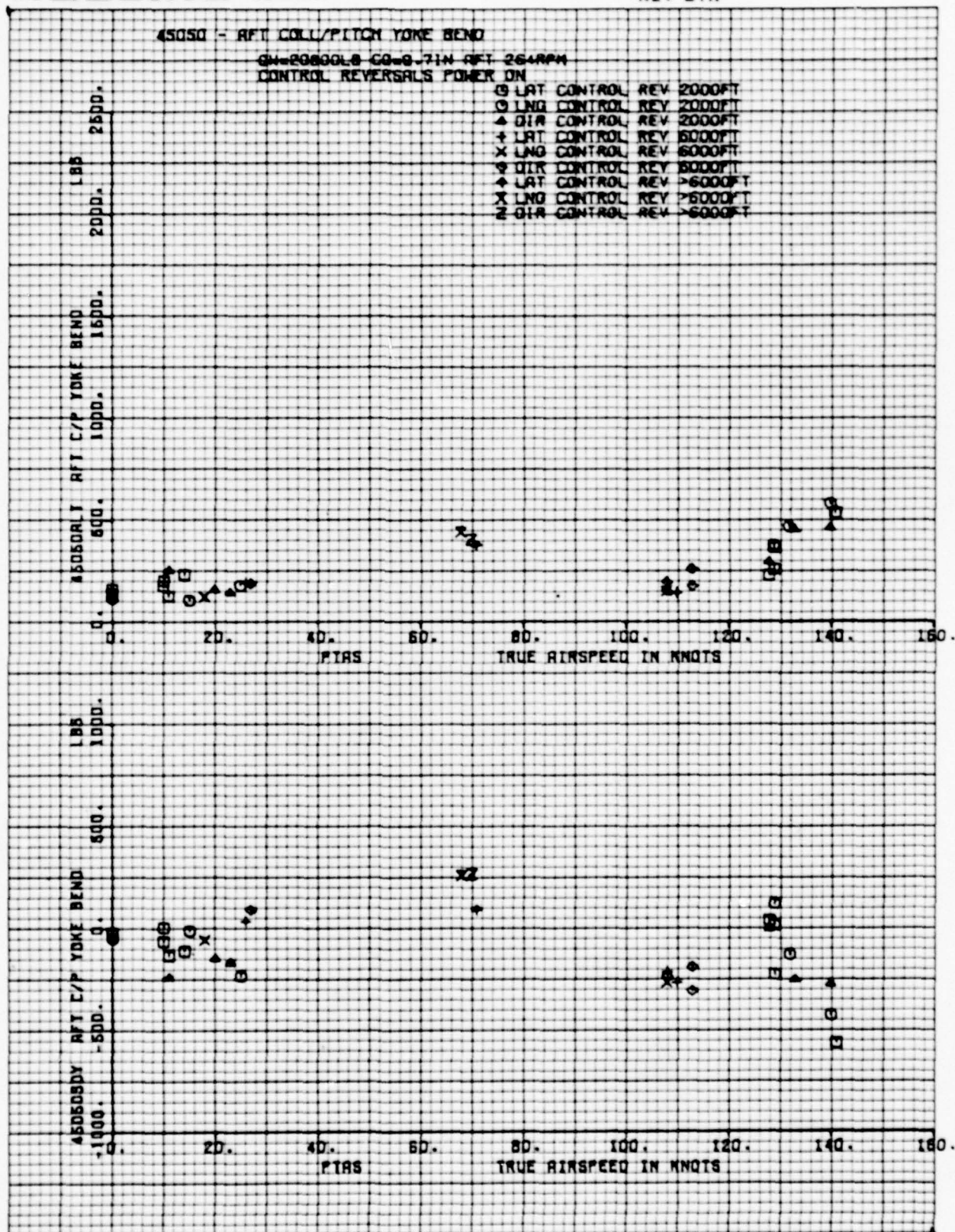


THE **BOEING** COMPANY

45050 - RFT COLL/PITCH YDKE BEND

GN-20800LS G0-8.7IN RFT 264MM
CONTROL REVERSALS POWER ON

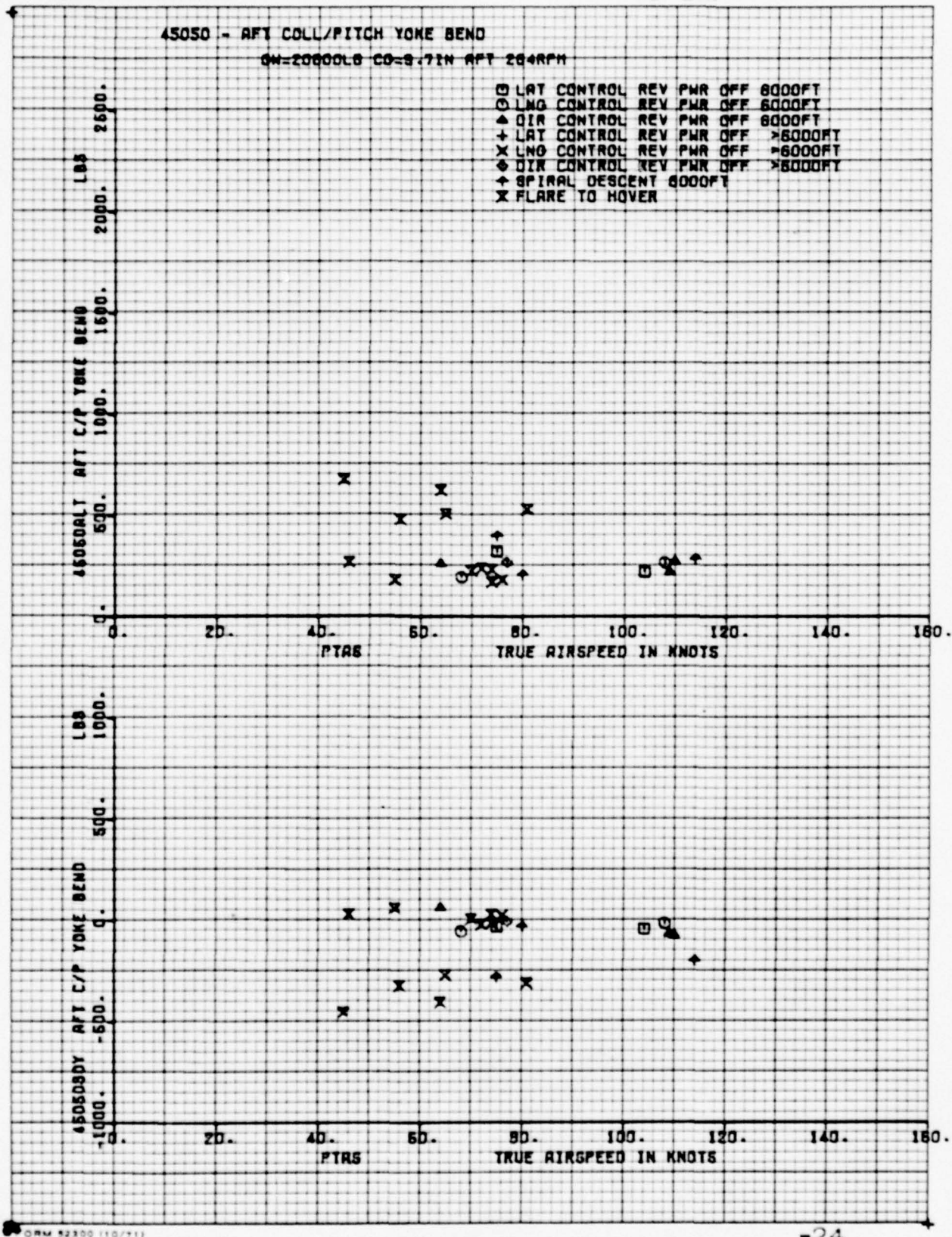
○ LAT CONTROL	REV 2000FT
○ LNO CONTROL	REV 2000FT
△ DIR CONTROL	REV 2000FT
+ LAT CONTROL	REV 6000FT
x LNO CONTROL	REV 6000FT
▽ DIR CONTROL	REV 6000FT
◆ LAT CONTROL	REV >6000FT
x LNO CONTROL	REV >6000FT
z DIR CONTROL	REV >6000FT



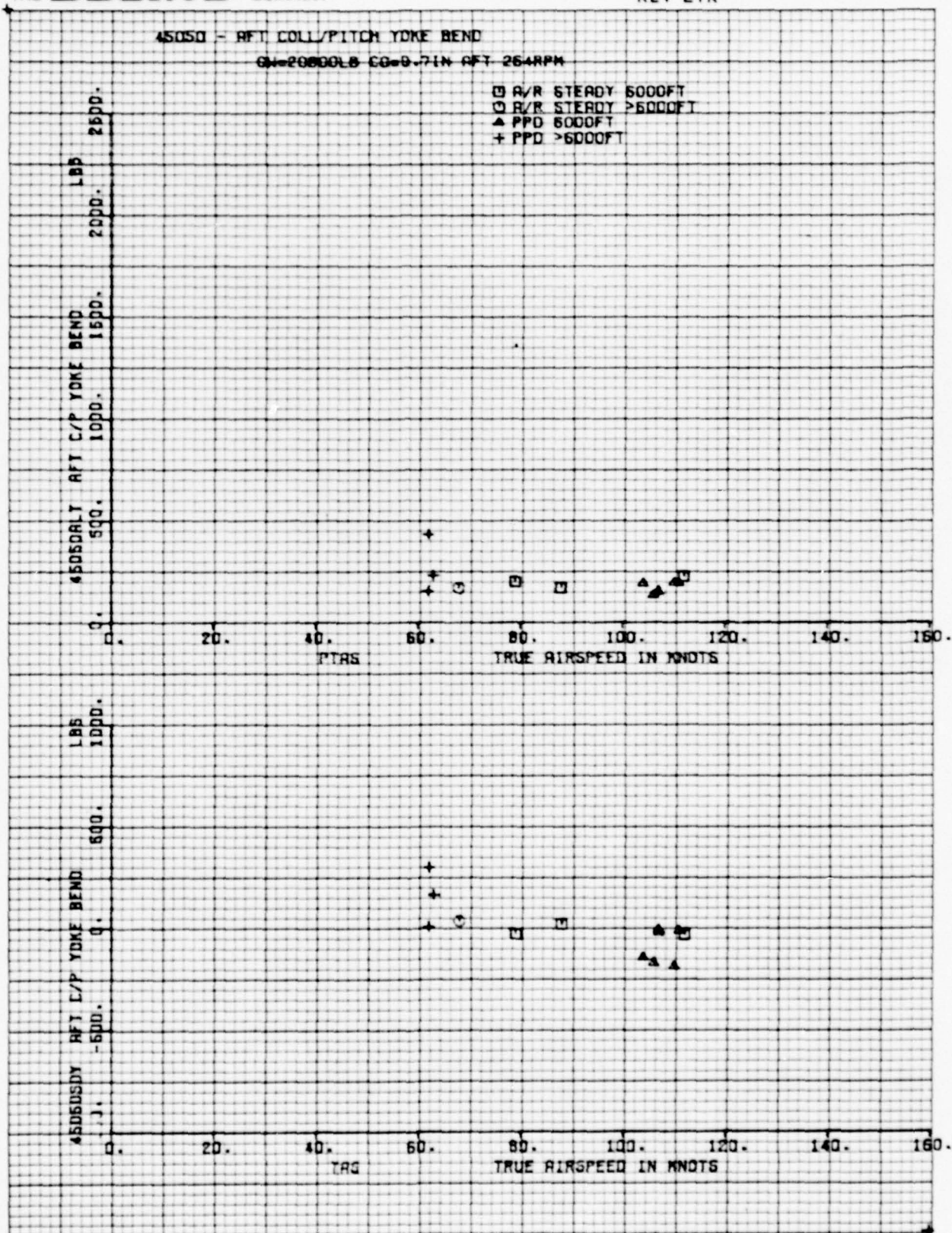
FORM 52300 (10/71)

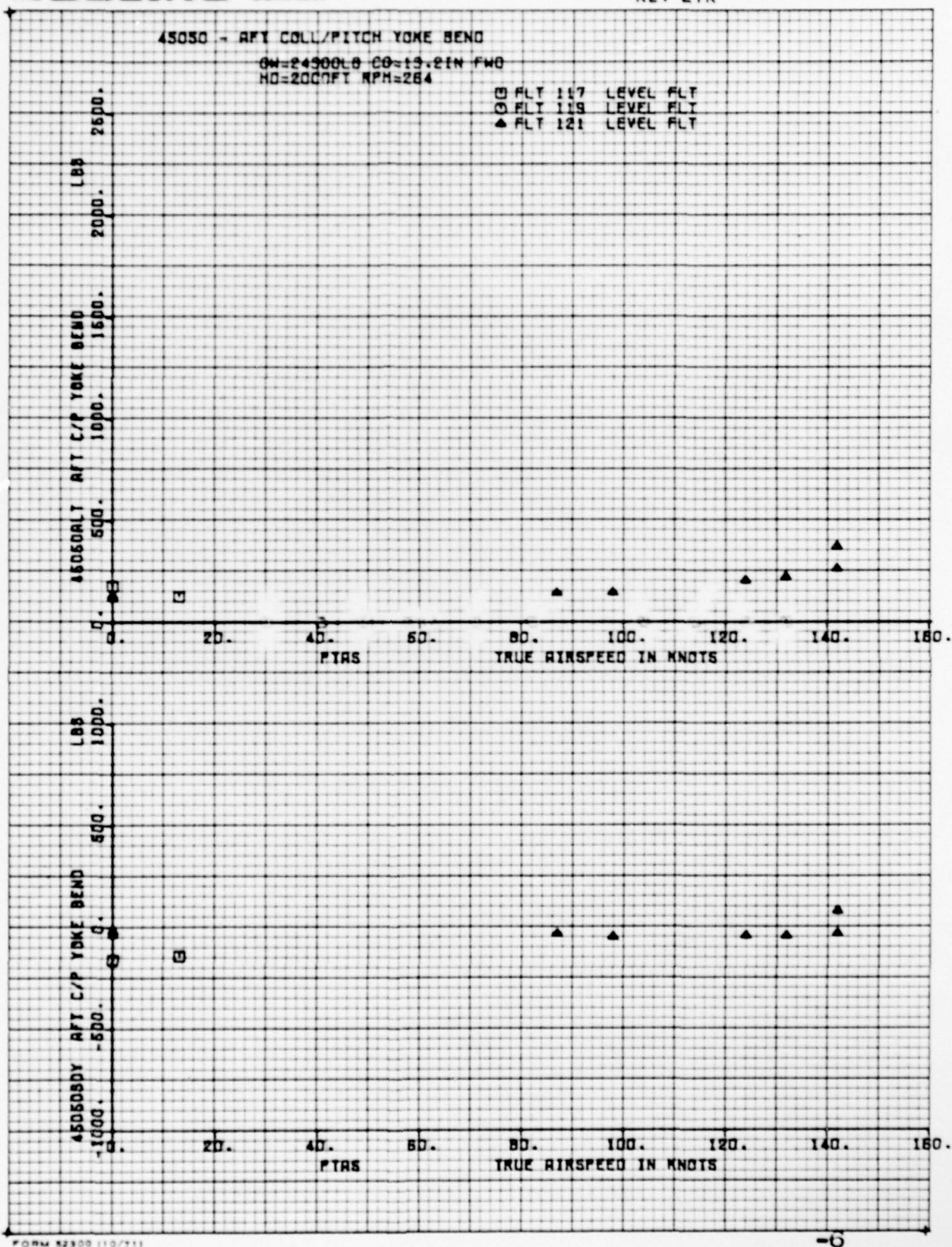
SHEET 350

-20

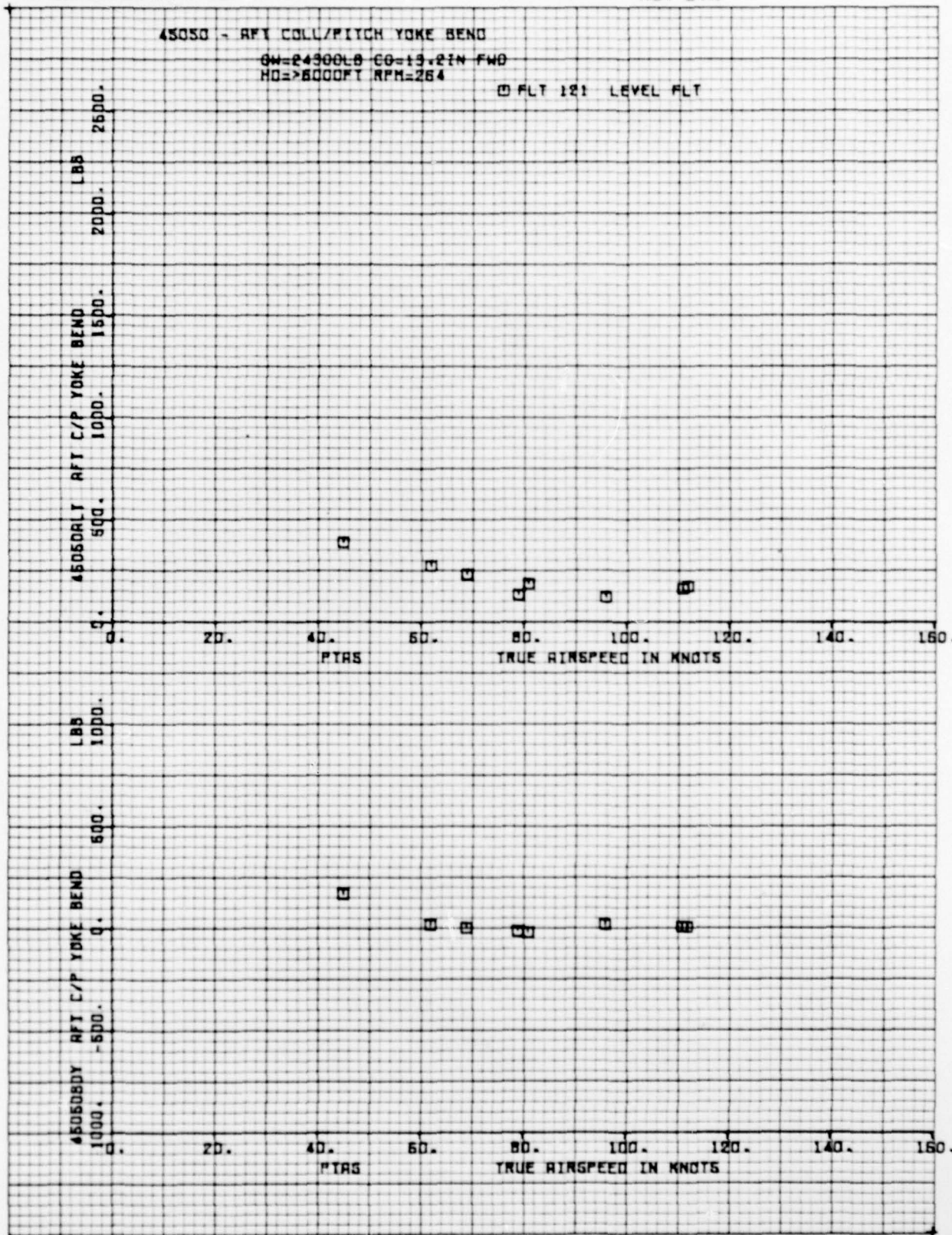


ORR 52300 (10/71)





THE **BOEING** COMPANY



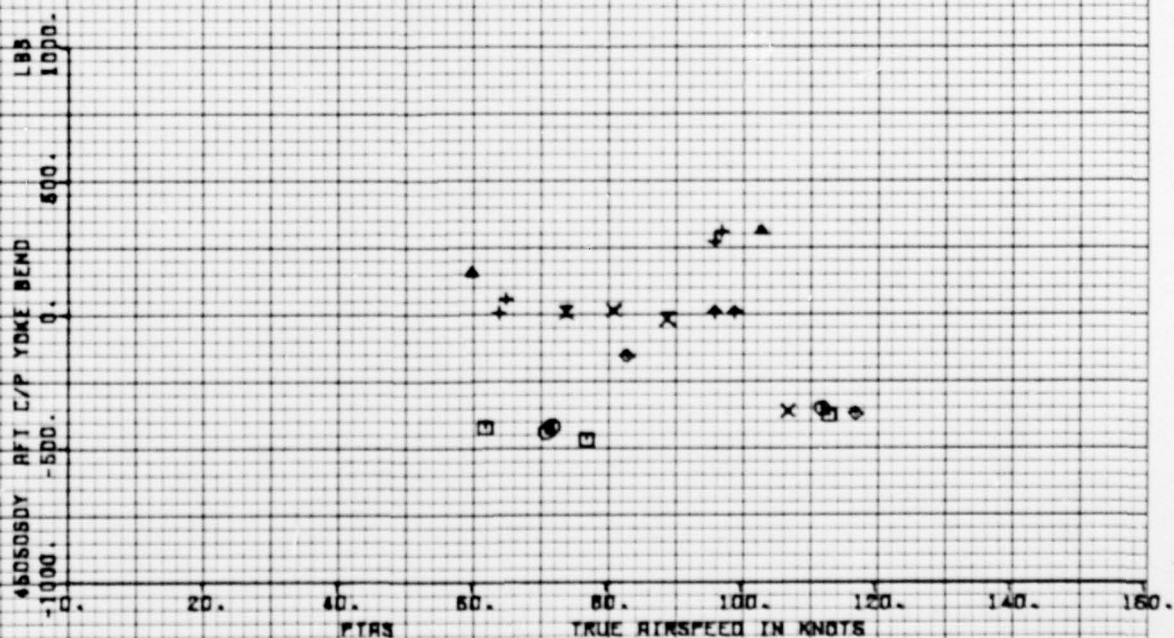
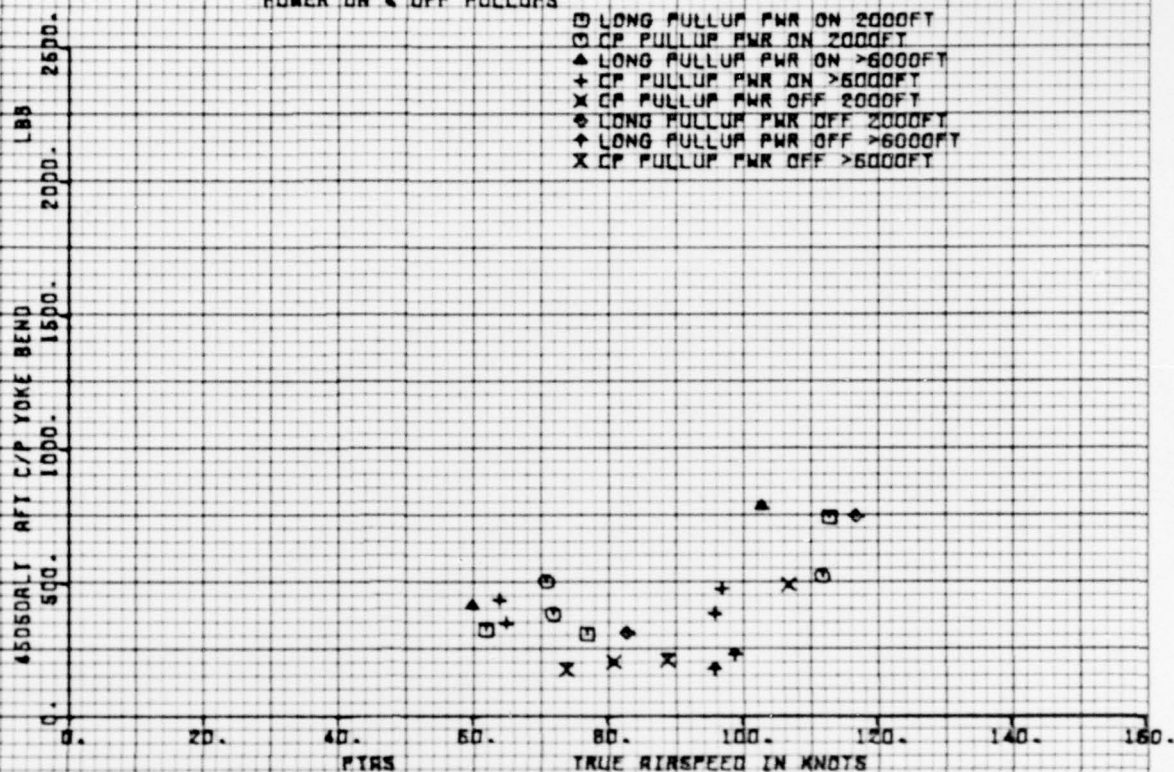
FORM 52300 (110/71)

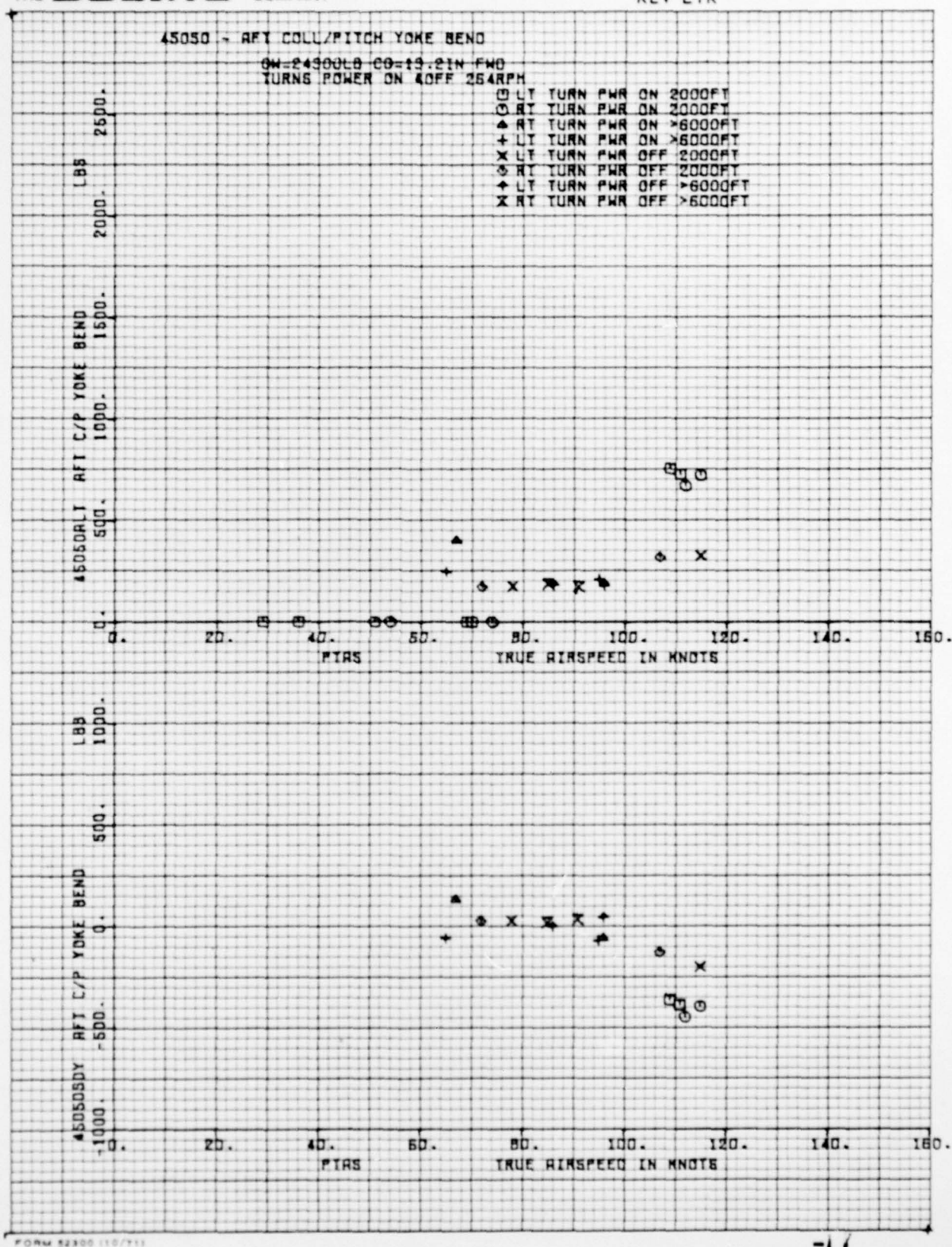
THE **BOEING** COMPANY

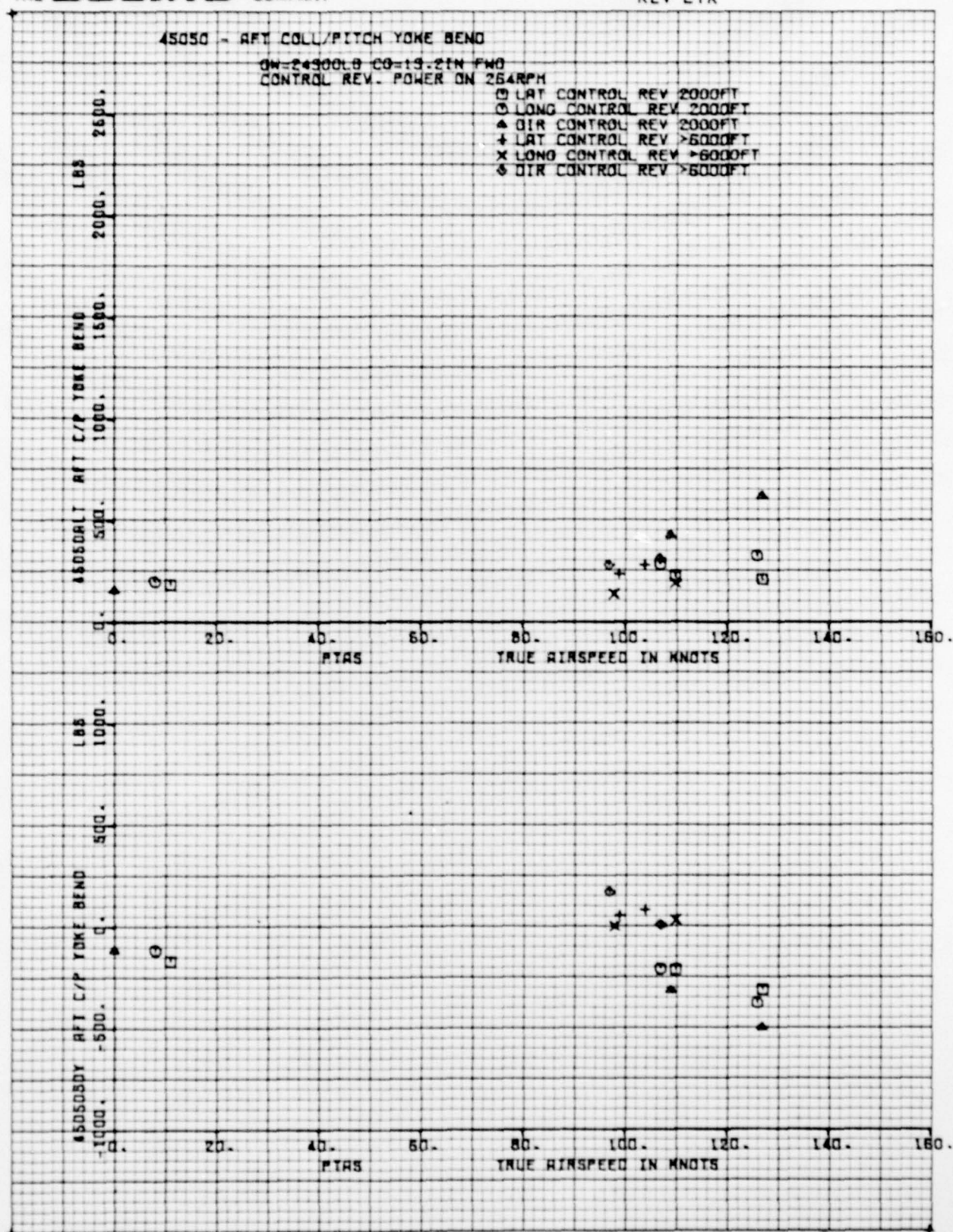
45050 - AFT COLL/PITCH YOKE BEND

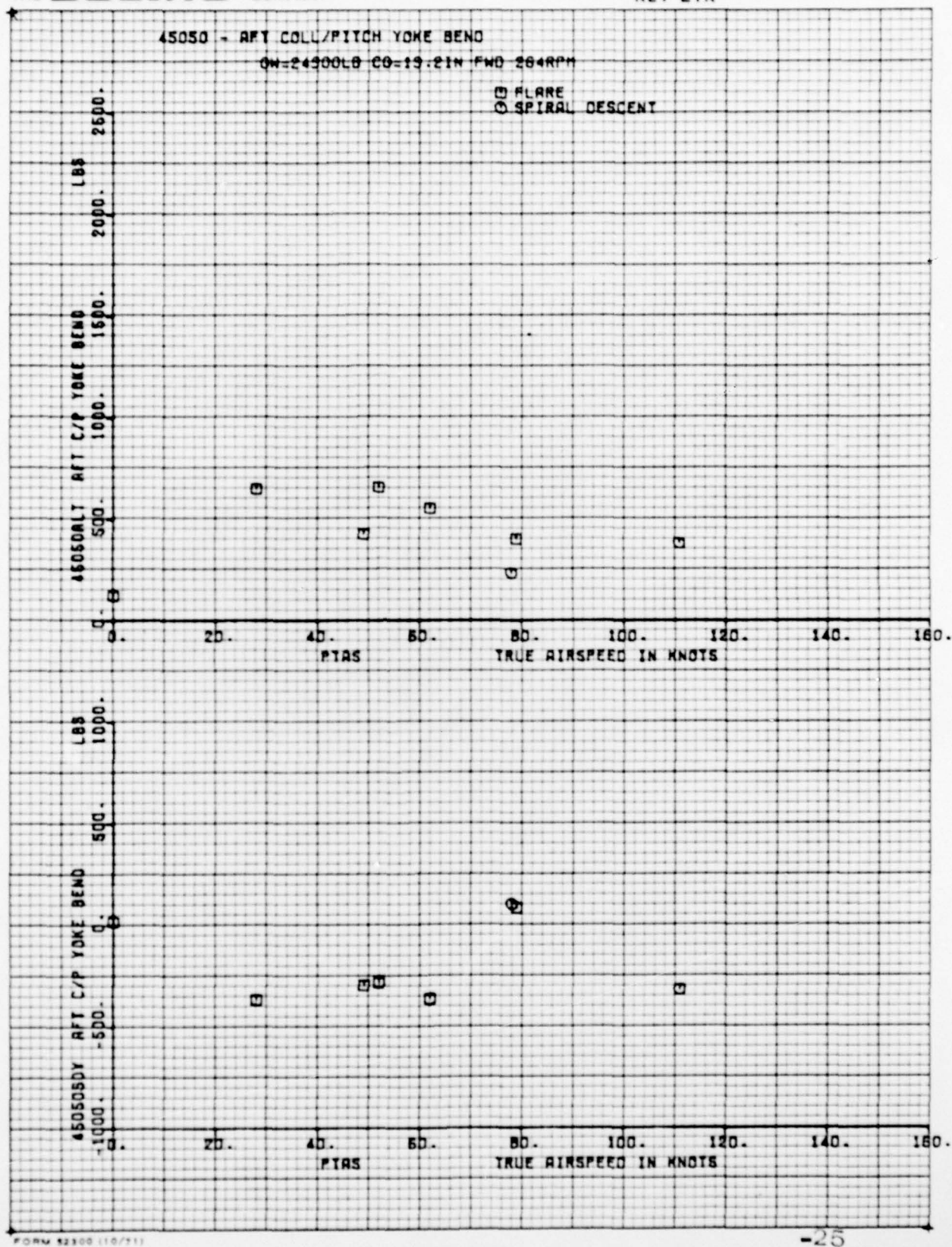
GW=24500LB GO=13.2IN FWD
POWER ON & OFF PULLUPS

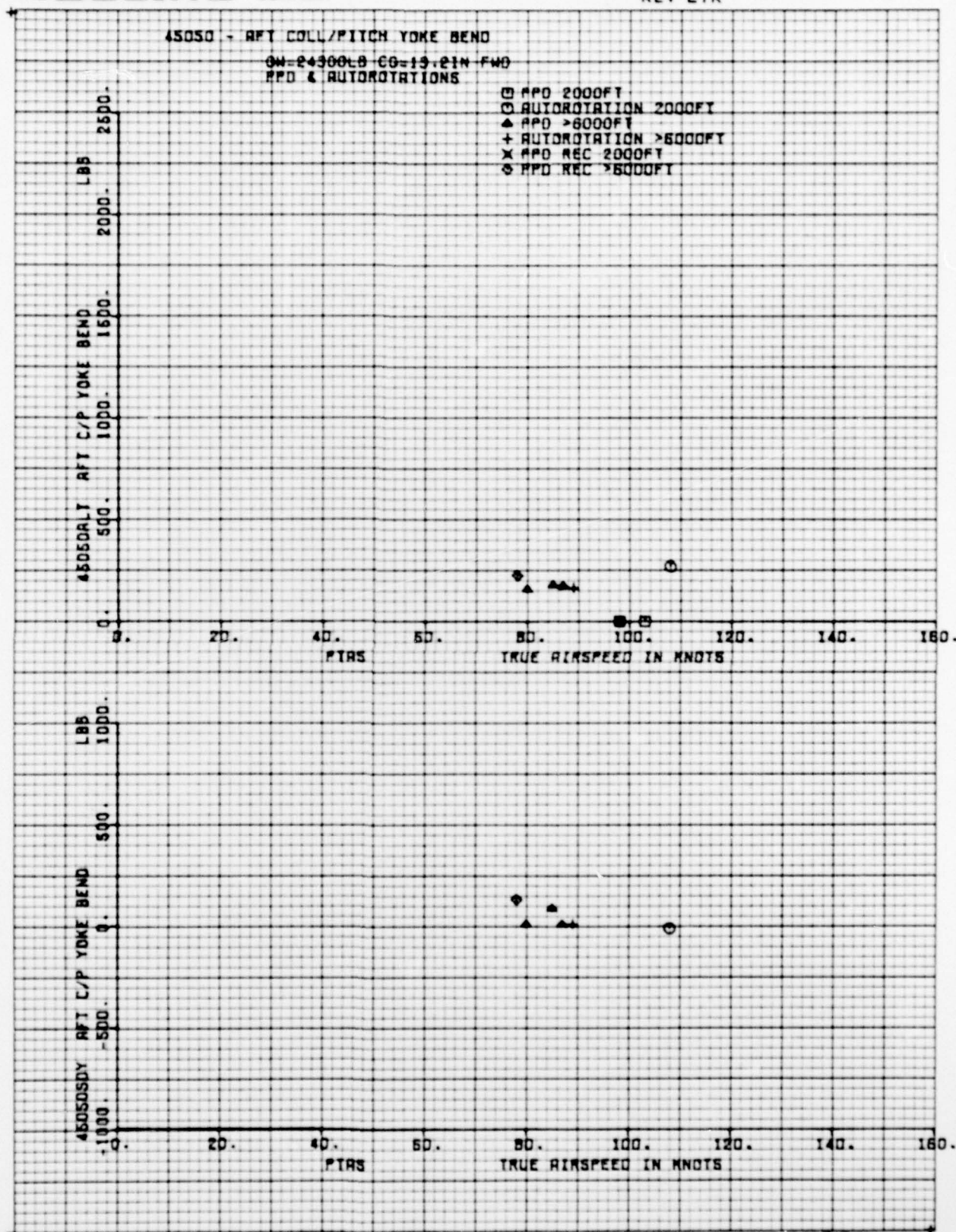
- LONG PULLUP PWR ON 2000FT
- CP PULLUP PWR ON 2000FT
- ▲ LONG PULLUP PWR ON >6000FT
- + CP PULLUP PWR ON >6000FT
- × CP PULLUP PWR OFF 2000FT
- ◇ LONG PULLUP PWR OFF 2000FT
- ↑ LONG PULLUP PWR OFF >6000FT
- × CP PULLUP PWR OFF >6000FT

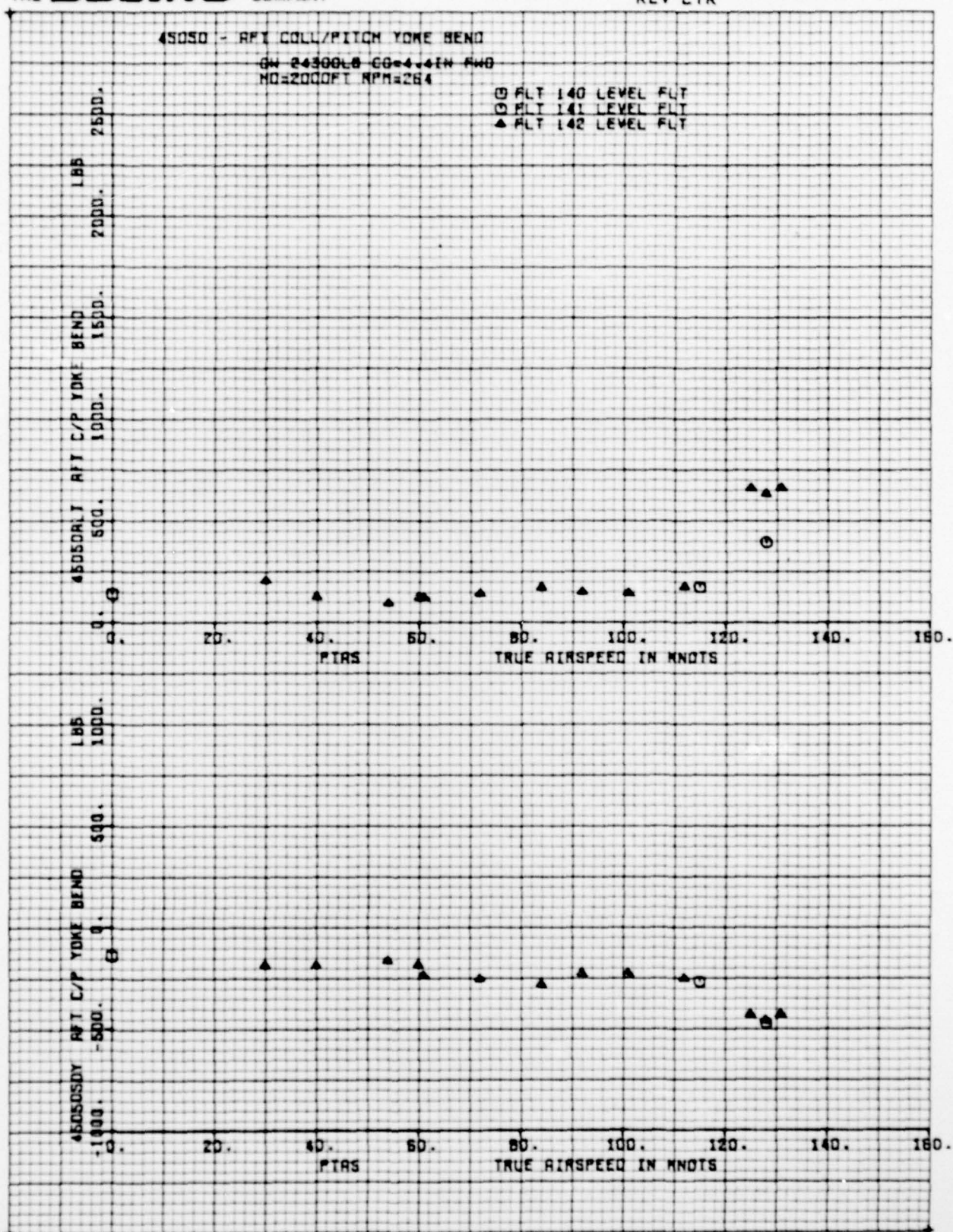


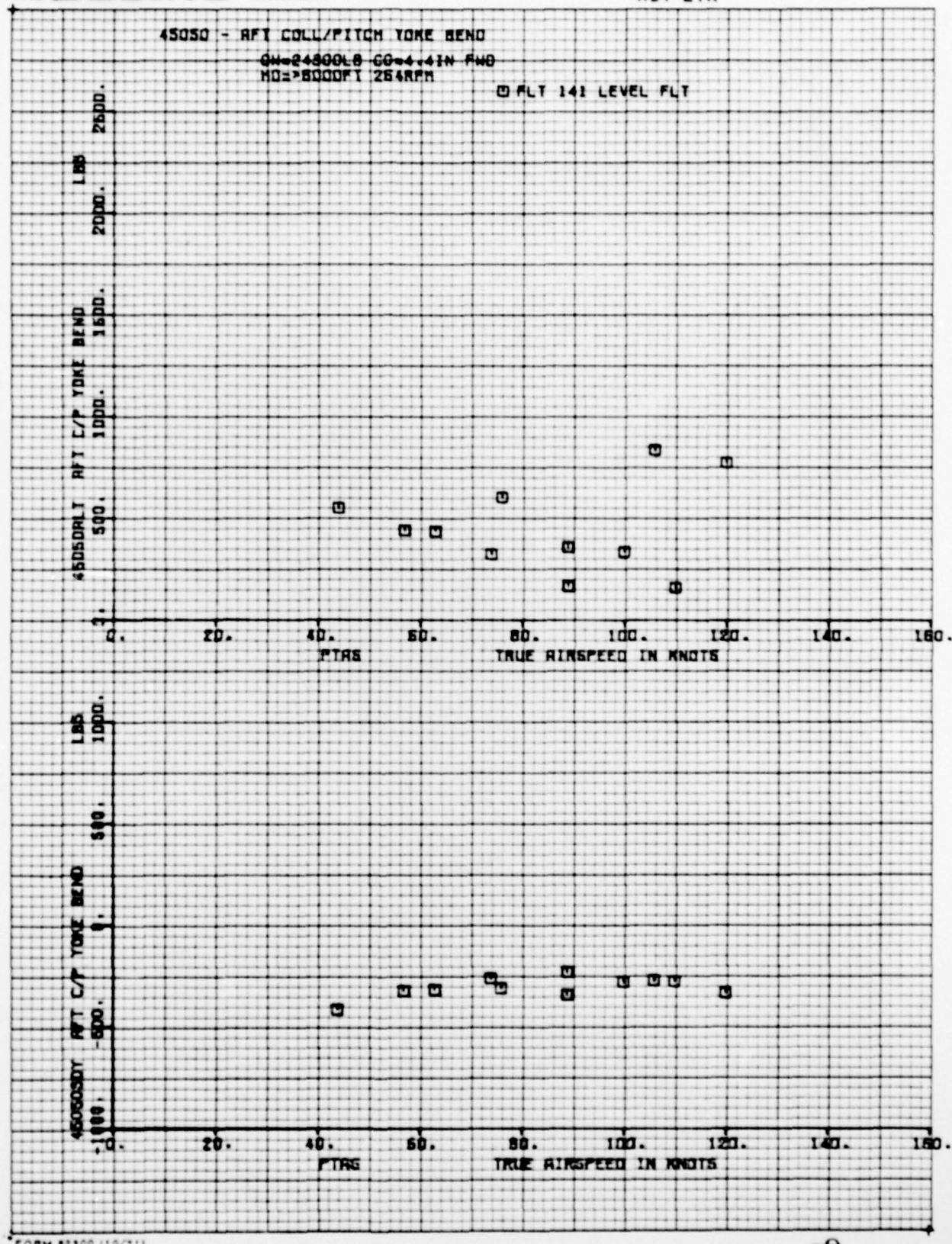










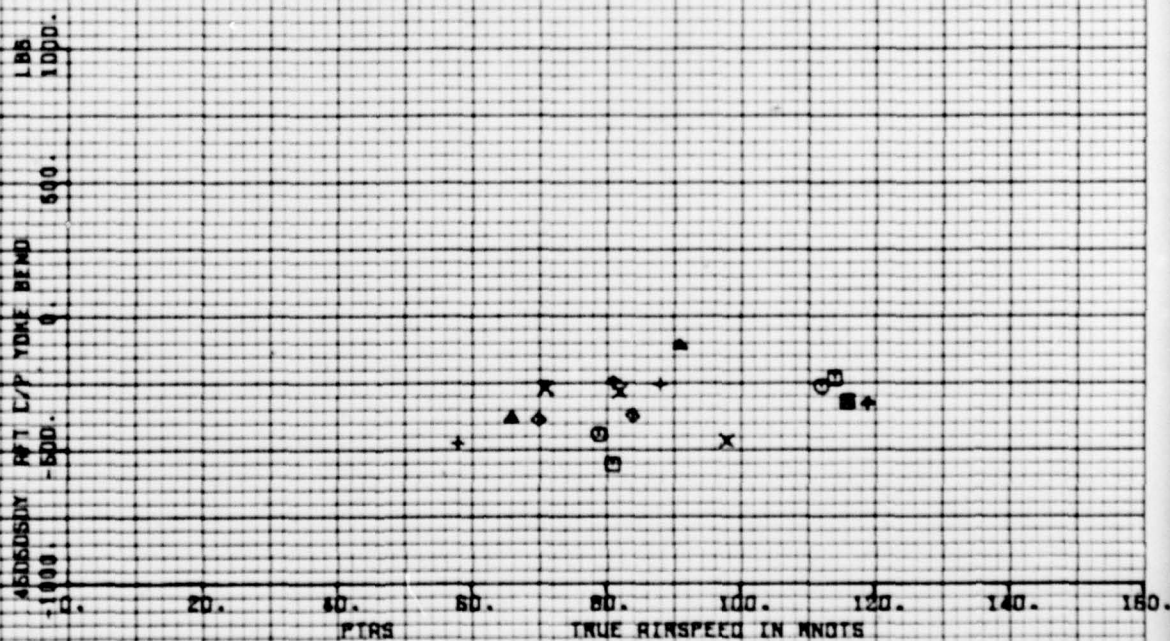
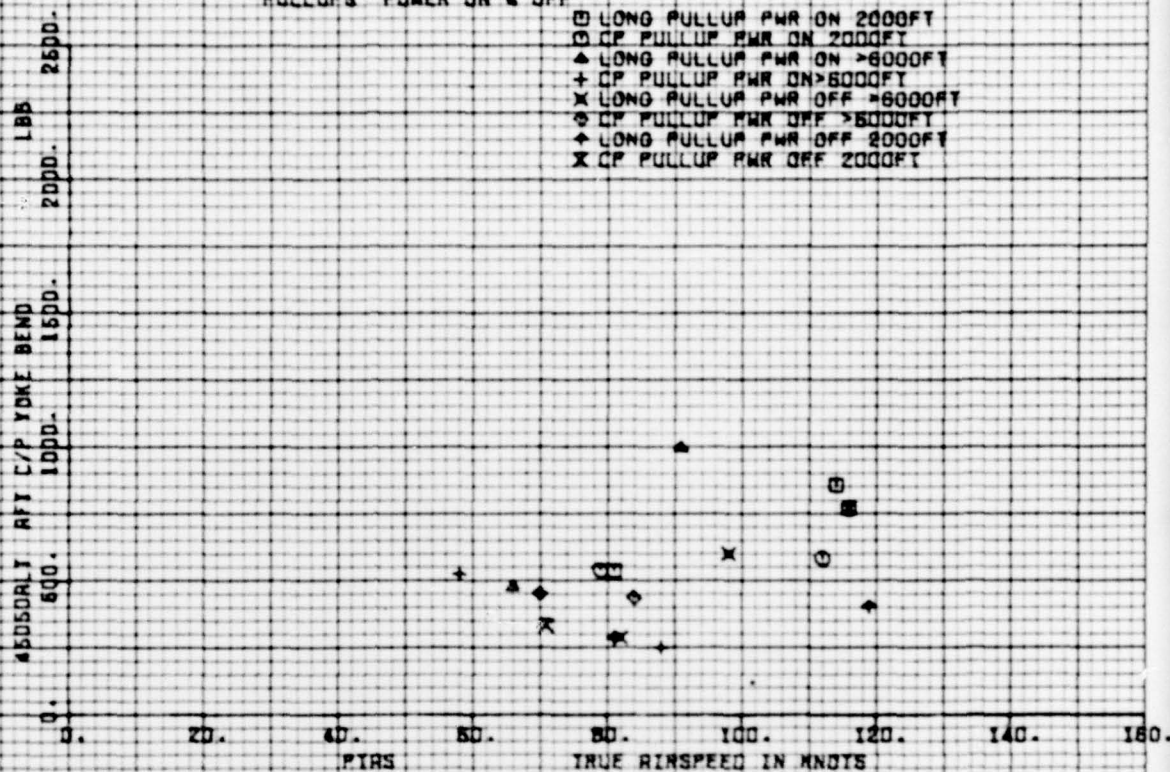


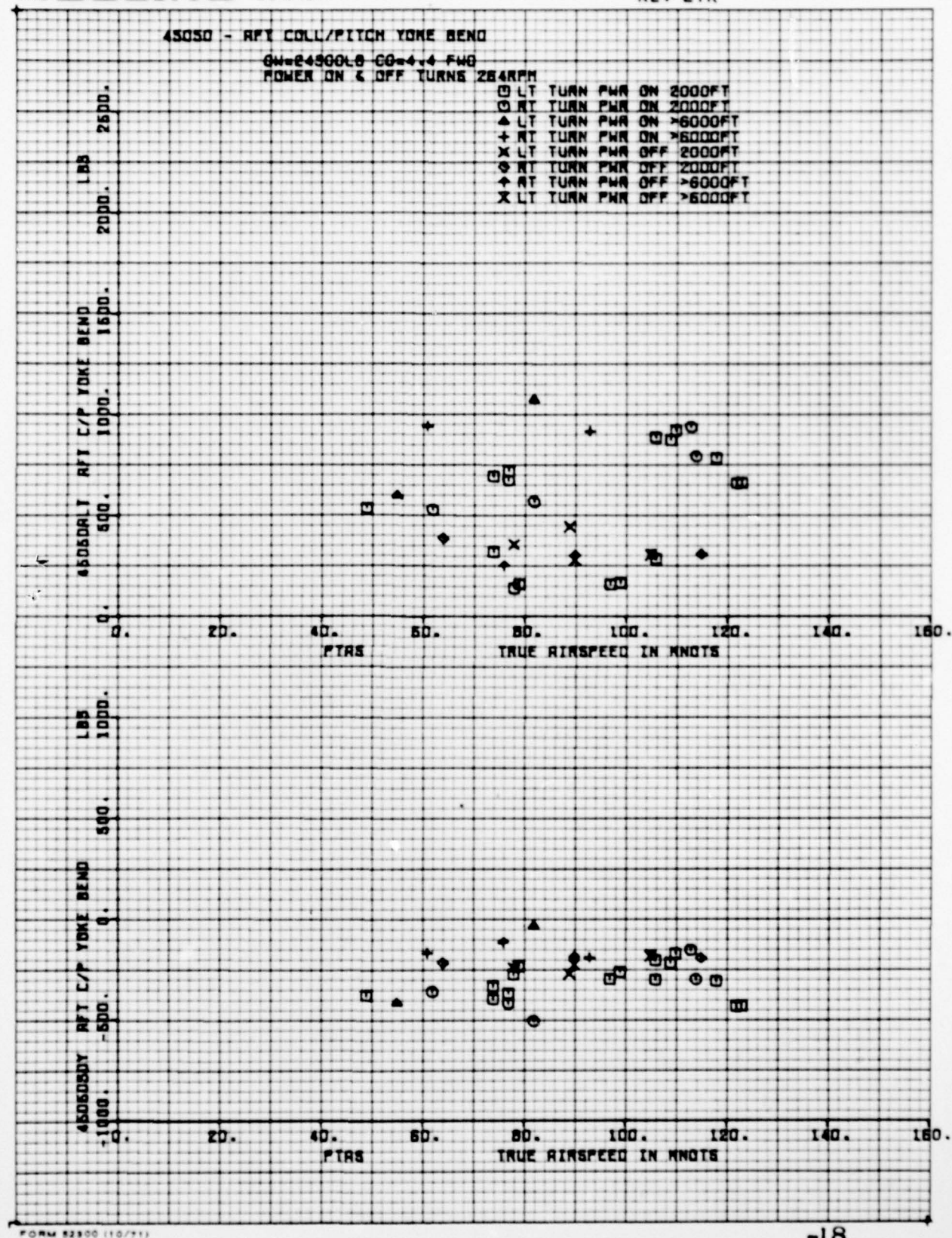
THE **BOEING** COMPANY

45050 - AFT COLL/PITCH YOKE BEND

GW=245000LB CO=4.4 FWD 264RPM
PULLUPS POWER ON & OFF

- LONG PULLUP PWR ON 2000FT
- CP PULLUP PWR ON 2000FT
- ▲ LONG PULLUP PWR ON >6000FT
- + CP PULLUP PWR ON >6000FT
- × LONG PULLUP PWR OFF >6000FT
- CP PULLUP PWR OFF >6000FT
- ◆ LONG PULLUP PWR OFF 2000FT
- × CP PULLUP PWR OFF 2000FT



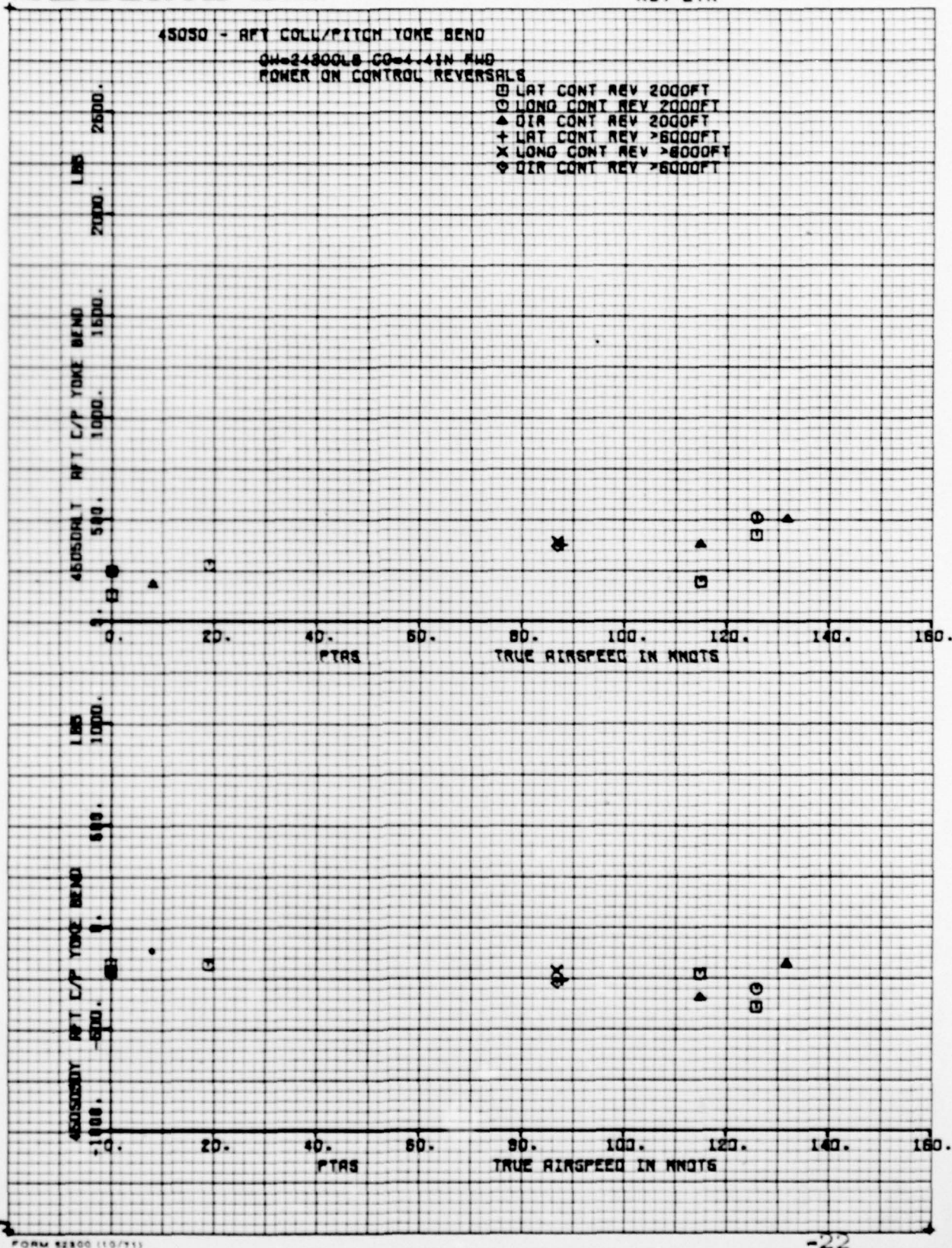


THE **BOEING** COMPANY

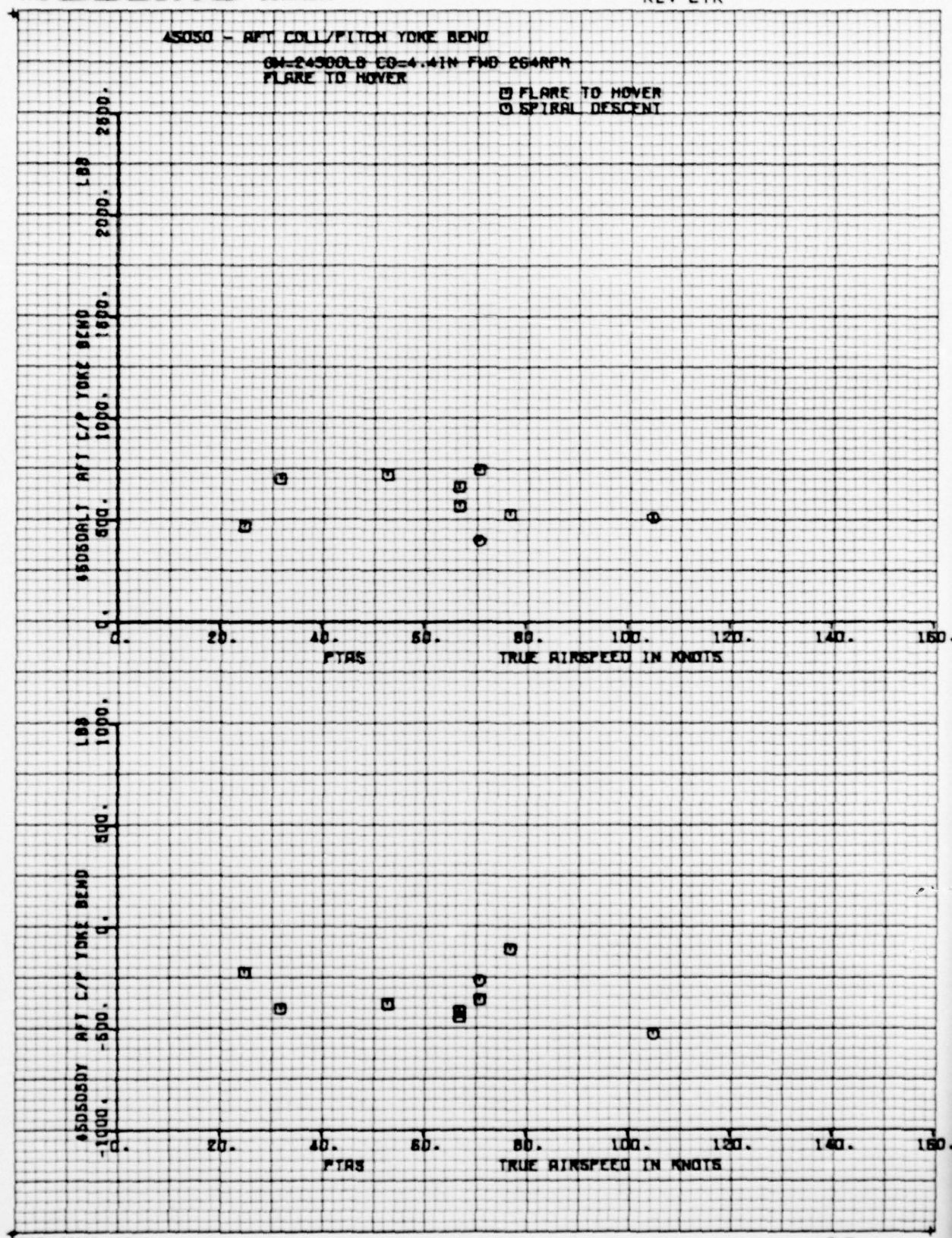
45050 - RPT COLL/PITCH YOKE BEND

GW=24800LB CG=4.4IN FWD
POWER ON CONTROL REVERSALS

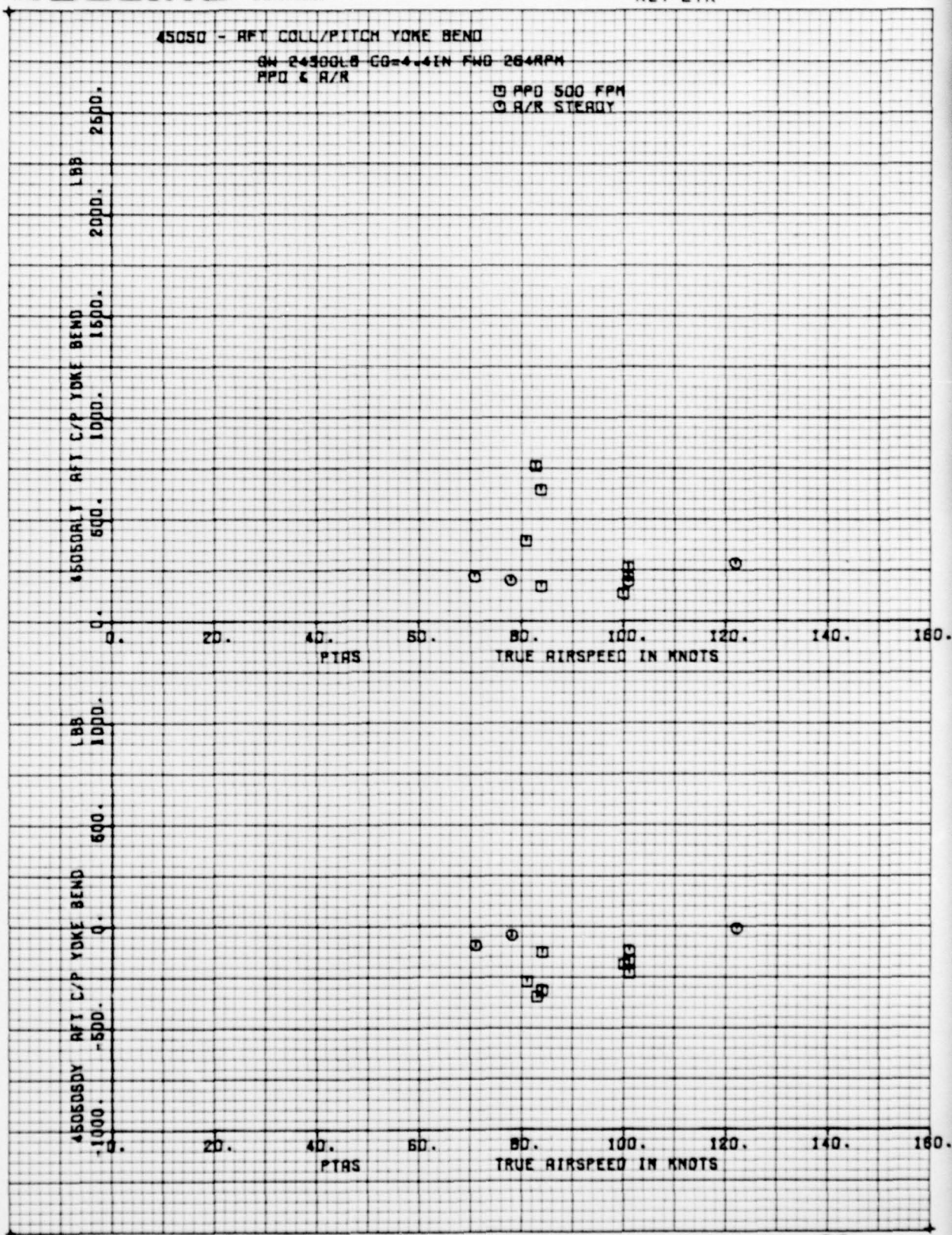
- LAT CONT REV 2000FT
- LONG CONT REV 2000FT
- ▲ DIR CONT REV 2000FT
- + LAT CONT REV >8000FT
- × LONG CONT REV >8000FT
- ◇ DIR CONT REV >8000FT



FORM 52800 (10/71)



THE **BOEING** COMPANY



FORM 52300 (10/71)

